Generate Txy Diagram with Aspen Plus® V8.0

1. Lesson Objectives

- Use **Method Assistant** in Aspen Plus to determine which property method to use to create a Txy diagram for the binary system of ethane and ethylene
- Learn how to generate Txy diagrams in Aspen Plus

2. Prerequisites

- Aspen Plus V8.0

3. Background

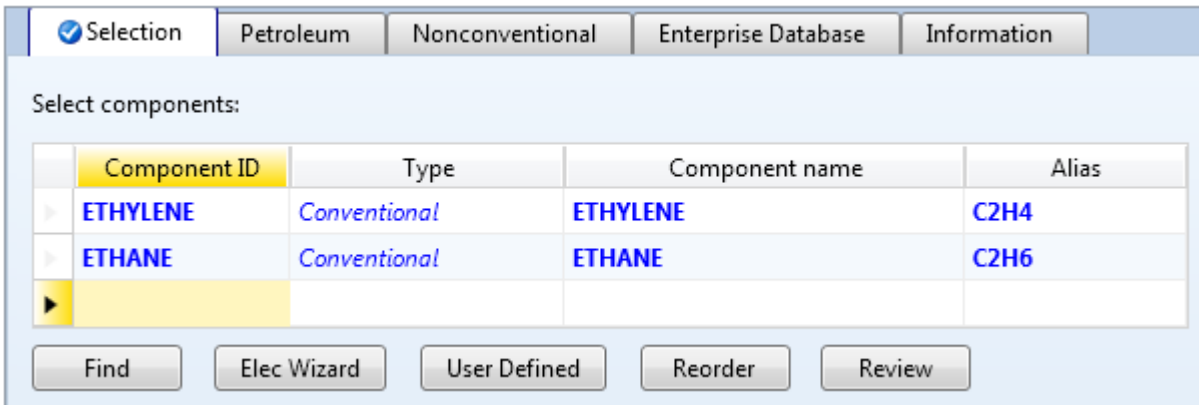
A glance at the Txy diagram for a binary system can quickly tell whether it is easy to separate the two components. If the x-curve and y-curve are not close together and there is no azeotrope, then it is easy to separate the two components using distillation. If there is an azeotrope, then we have to use some special technologies (e.g., extractive distillation) to separate them into pure components. If the x-curve and y-curve are very close together, it is more economical to use extractive distillation to separate them into pure components. Therefore, a Txy diagram is a very useful tool for things such as process synthesis and search of solvents.

The examples presented are solely intended to illustrate specific concepts and principles. They may not reflect an industrial application or real situation.

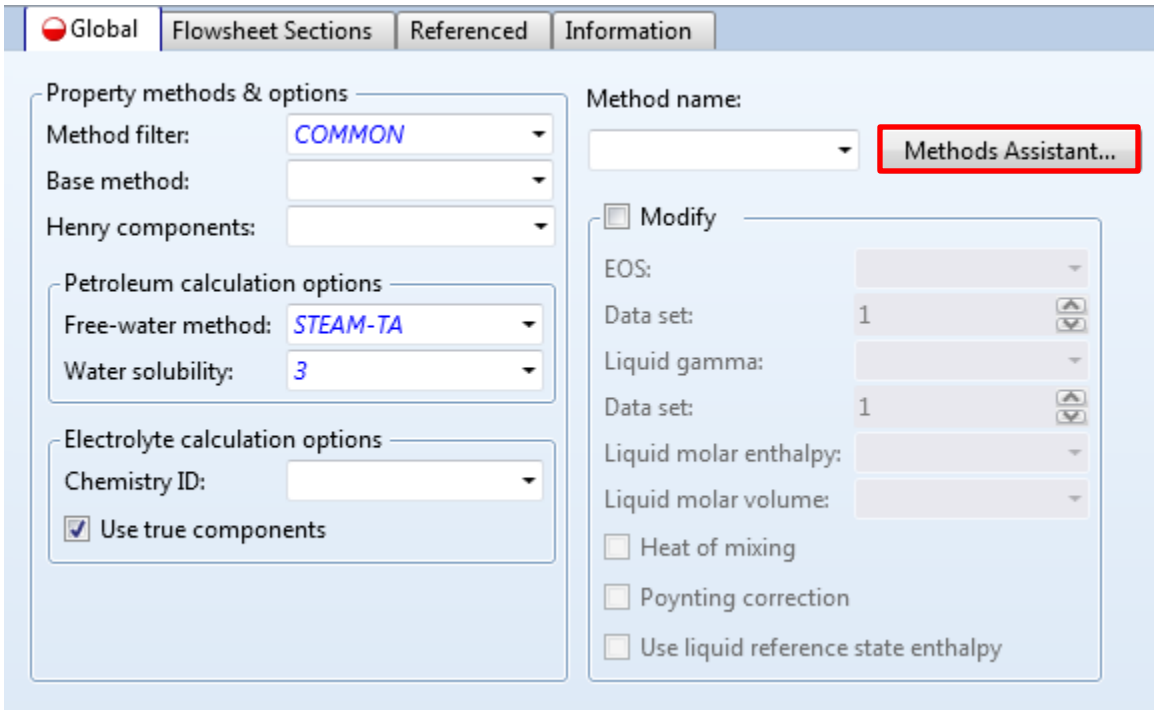
4. Aspen Plus Solution

If you are unfamiliar with how to start Aspen Plus, select components, or define methods, consult **Get Started Guide for New Users of Aspen Plus.pdf** for instructions.

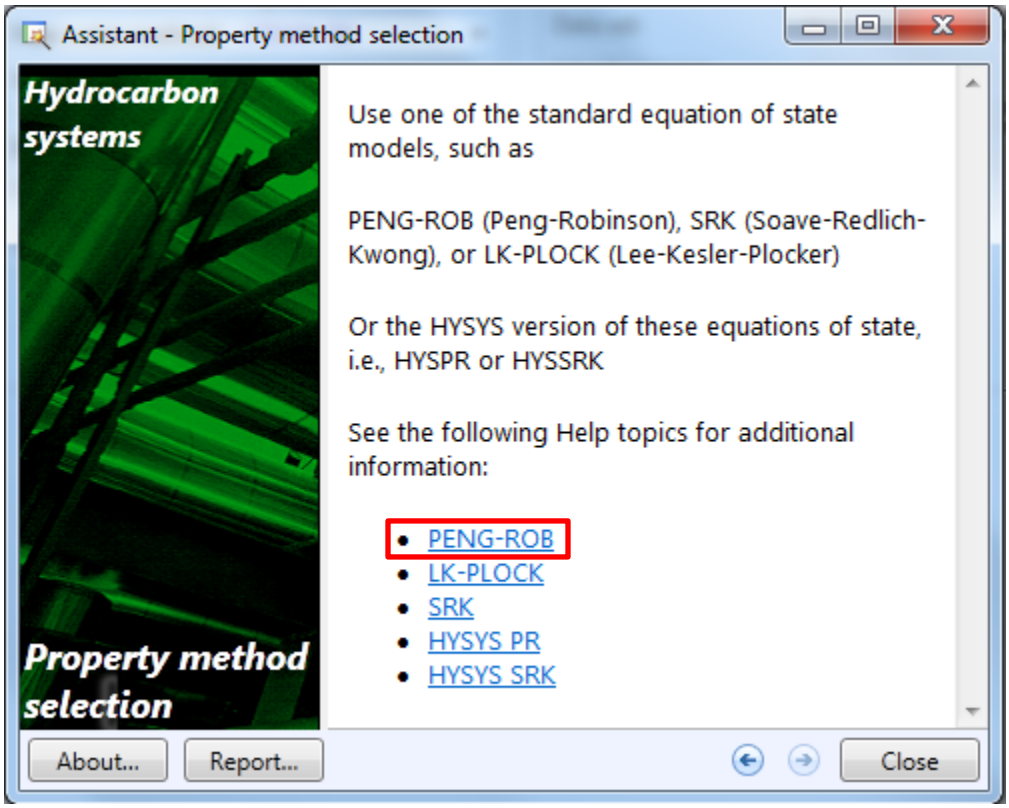
4.01. Create a new simulation in Aspen Plus using the **Blank Simulation** template. The **Components | Specification | Selection** sheet is displayed. Enter **ETHYLENE** and **ETHANE** for **Component ID**.



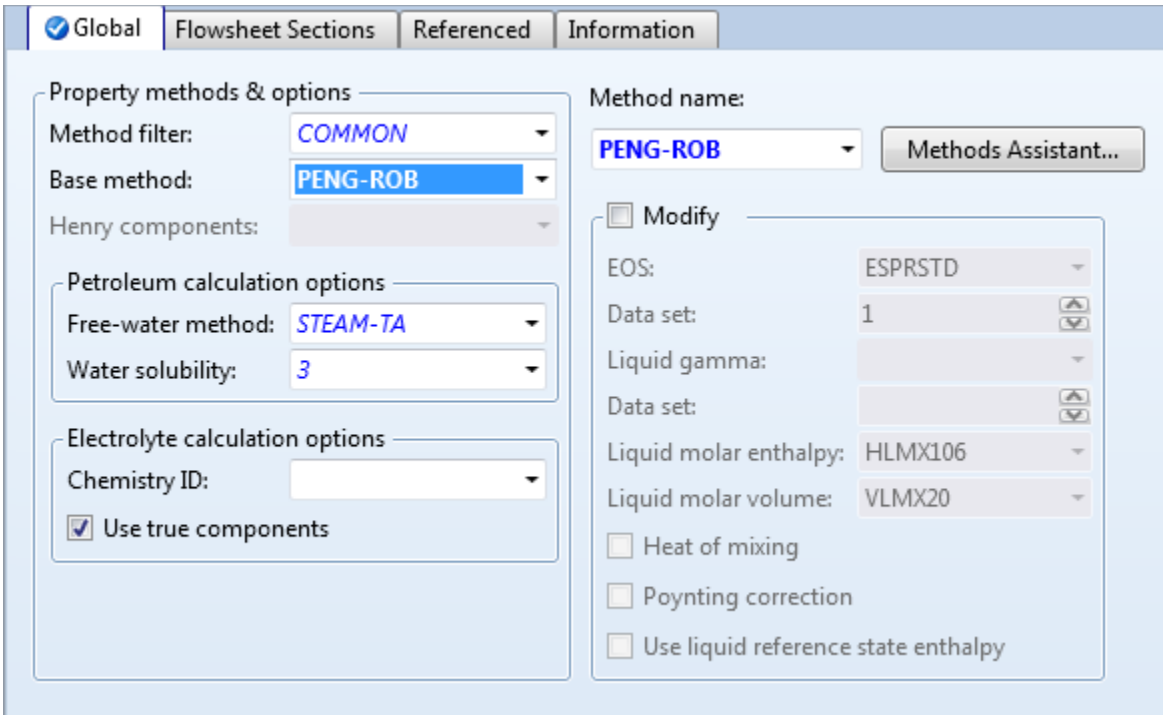
4.02. Go to the **Methods | Specifications | Global** sheet. Click the **Method assistant** button. The Method assistant feature in Aspen Plus helps the user to determine which property method to use for a specific problem.



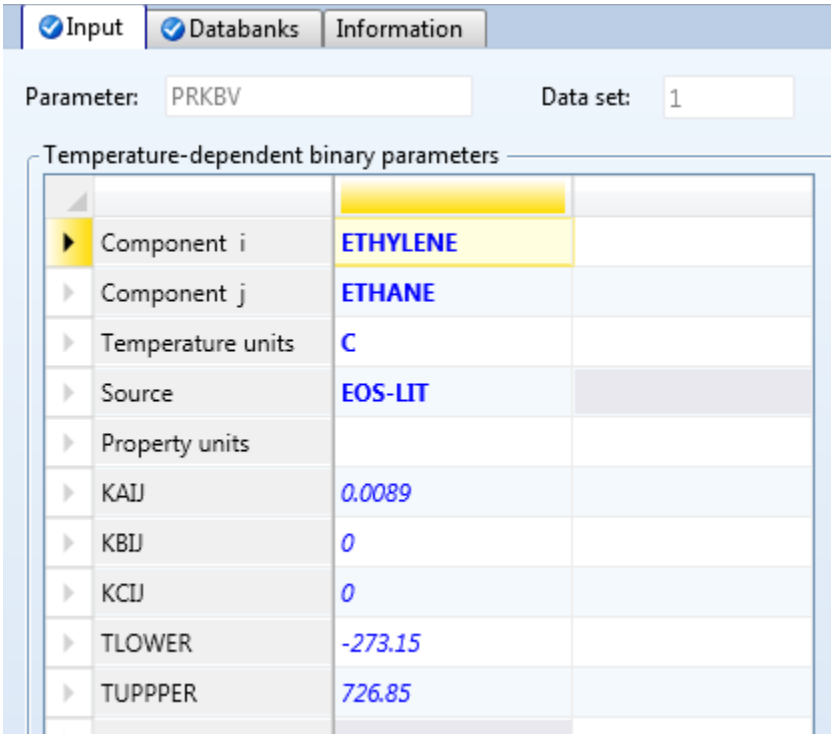
4.03. In the **Assistant – Property method selection** window, select **Next | Specify component type | Hydrocarbon system | No**. The Method assistant will then recommend several methods. In this tutorial, we will use Peng-Robinson for the property method.



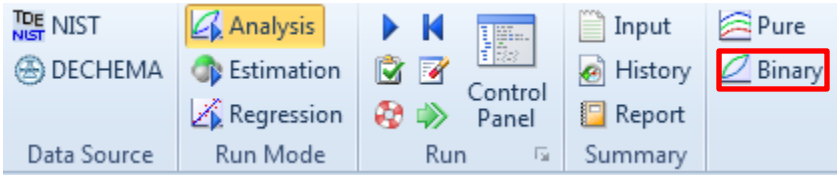
4.04. Click the **Close** button to exit the methods assistant window. Select **PENG-ROB** for **Base method**.



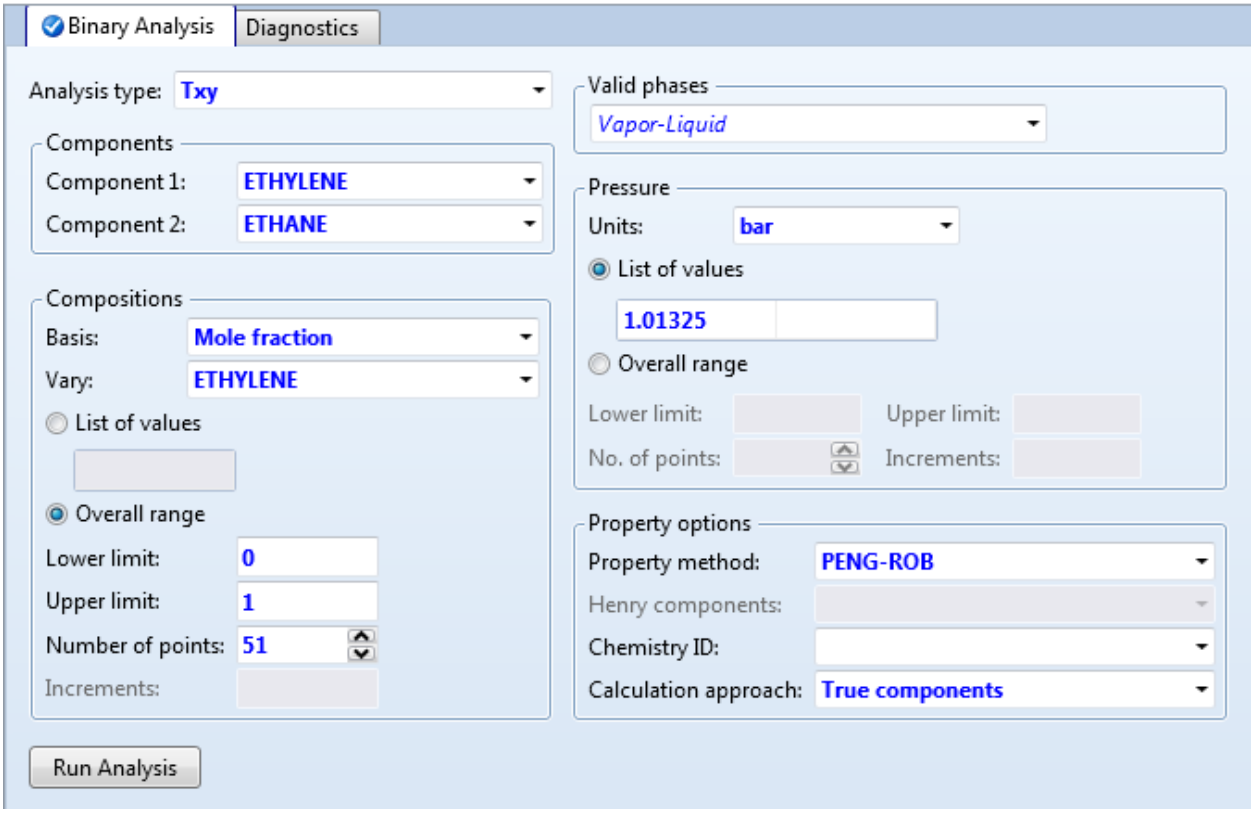
4.05. In the navigation pane, select **Methods | Parameters | Binary Interaction | PRKBV-1** node to populate binary interaction parameters. This can also be achieved by pressing **F4 key**. The binary interaction parameters are displayed on the **Methods | Parameters | Binary Interaction | PRKBV-1 | Input** sheet.



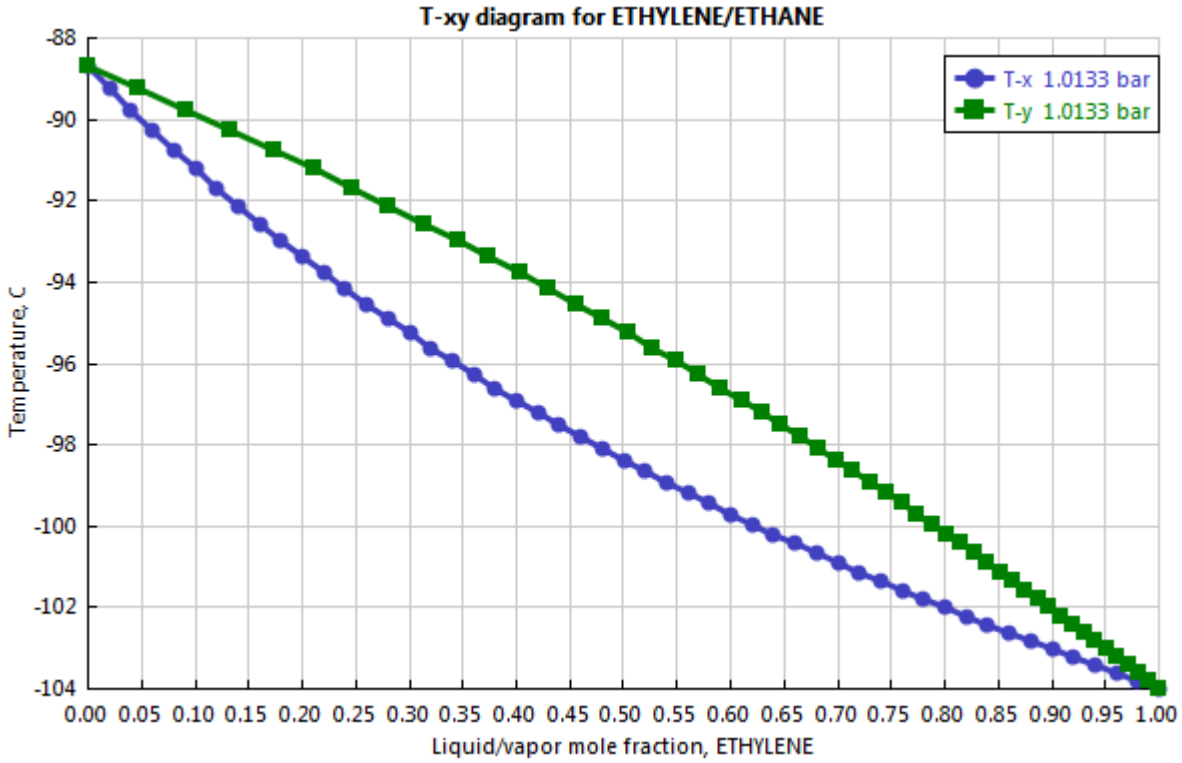
4.06. Click the **Analysis | Binary** button on the **Home** tab of the ribbon.



4.07. The **Analysis | BINRY-1 | Input Binary Analysis** sheet is displayed. Confirm that **Component 1** is **ETHYLENE** and **Component 2** is **ETHANE**.



4.08. Click the **Run analysis** button. The Txy diagram will be generated as shown below.



5. Conclusions

Based on the generated Txy diagram, it should be straightforward to separate ethane and ethylene using distillation. You should now be familiar with how to use the Methods assistant to help select base property methods, and you should be familiar with how to perform a binary analysis to generate Txy diagrams.

6. Copyright