Generate PT Envelope with Aspen Plus® V8.0

1. Lesson Objectives

- Learn how to generate PT envelopes in Aspen Plus

2. Prerequisites

- Aspen Plus V8.0

3. Background

It is very important to know the phase conditions of a mixture at a given temperature and pressure. For example, the phase conditions of a fluid in a heat exchanger have an impact on the heat transfer rate. Formation of bubbles (vapor phase) in inlet streams can also be very damaging to pumps. The phase conditions of a fluid in a pipe can impact pipeline calculations.

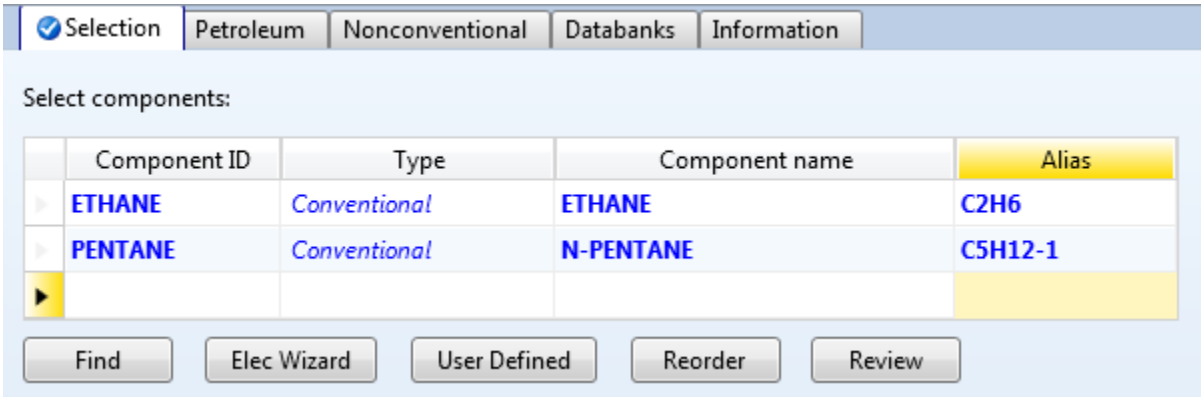
The PT envelope for a given mixture provides a complete picture of phase conditions for a given mixture.

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

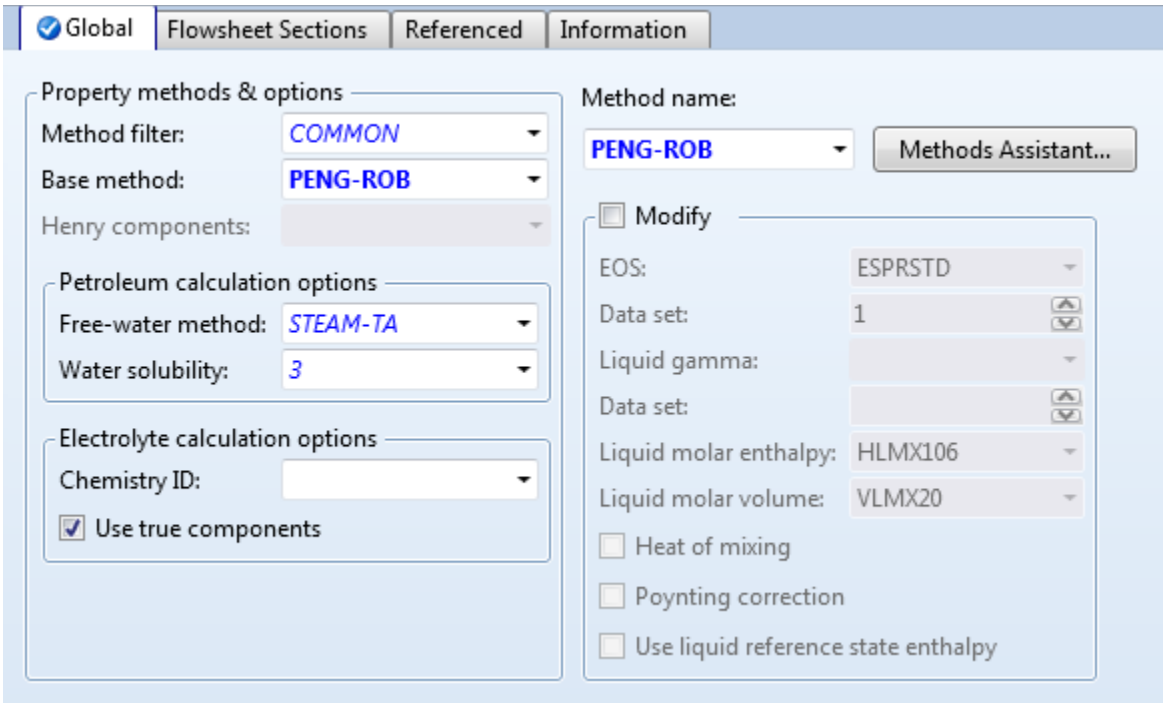
4. Aspen Plus Solution

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.

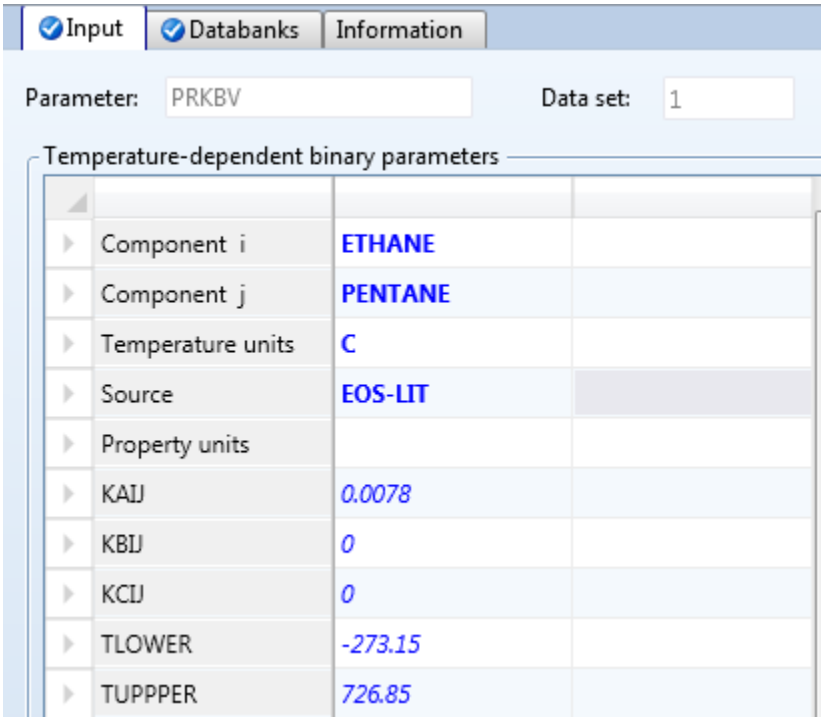
4.01. Create a new simulation in Aspen Plus using the **Blank Simulation** template. The **Components | Specification | Selection** sheet is displayed. Enter **ETHANE** and **PENTANE** for **Component ID**. Enter **C5H12-1** for **Alias** for **Pentane**.



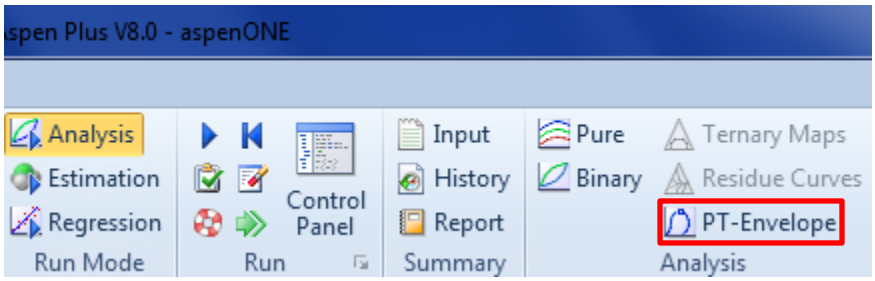
4.02. Go to the **Methods | Specifications | Global** sheet. Select **PENG-ROB** for **Base method** as shown below.



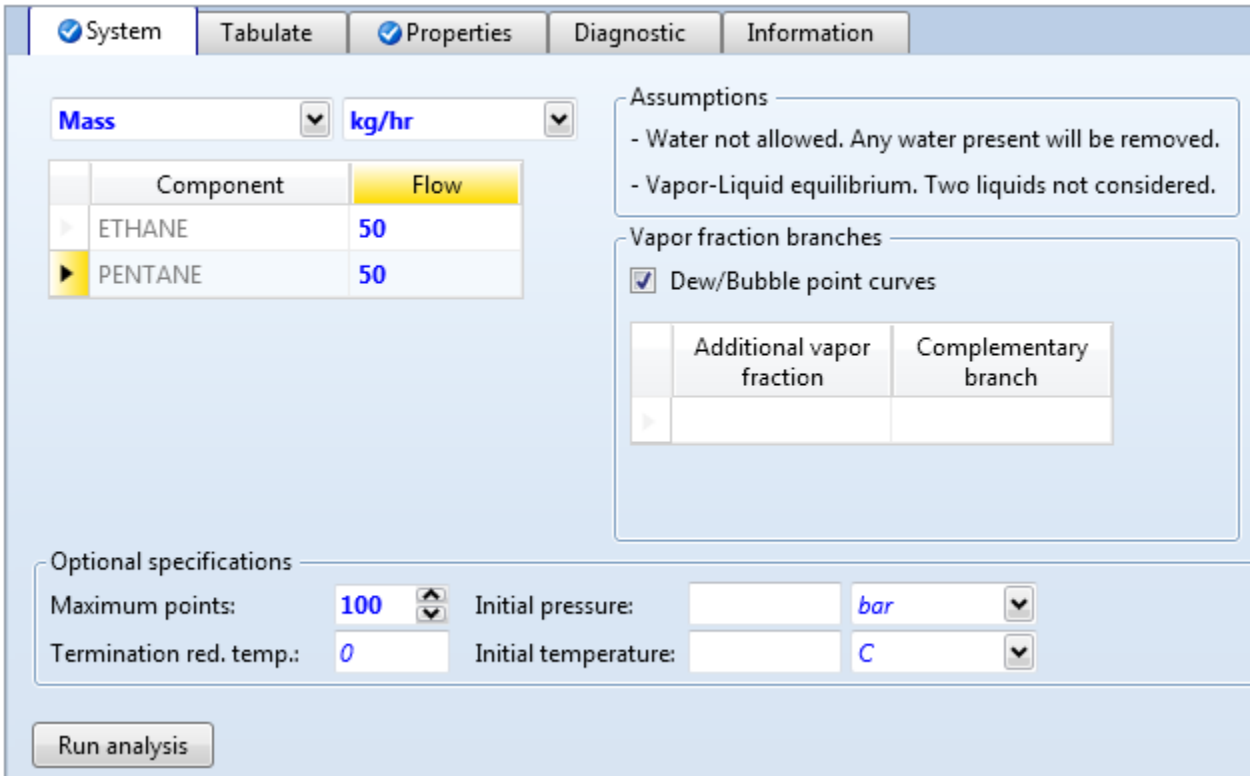
4.03. Click the **Next Input** button (or press the **F4** key) so that the binary interaction parameters are filled automatically on the **Methods | Parameters | Binary Interaction | PRKBV-1** sheet.



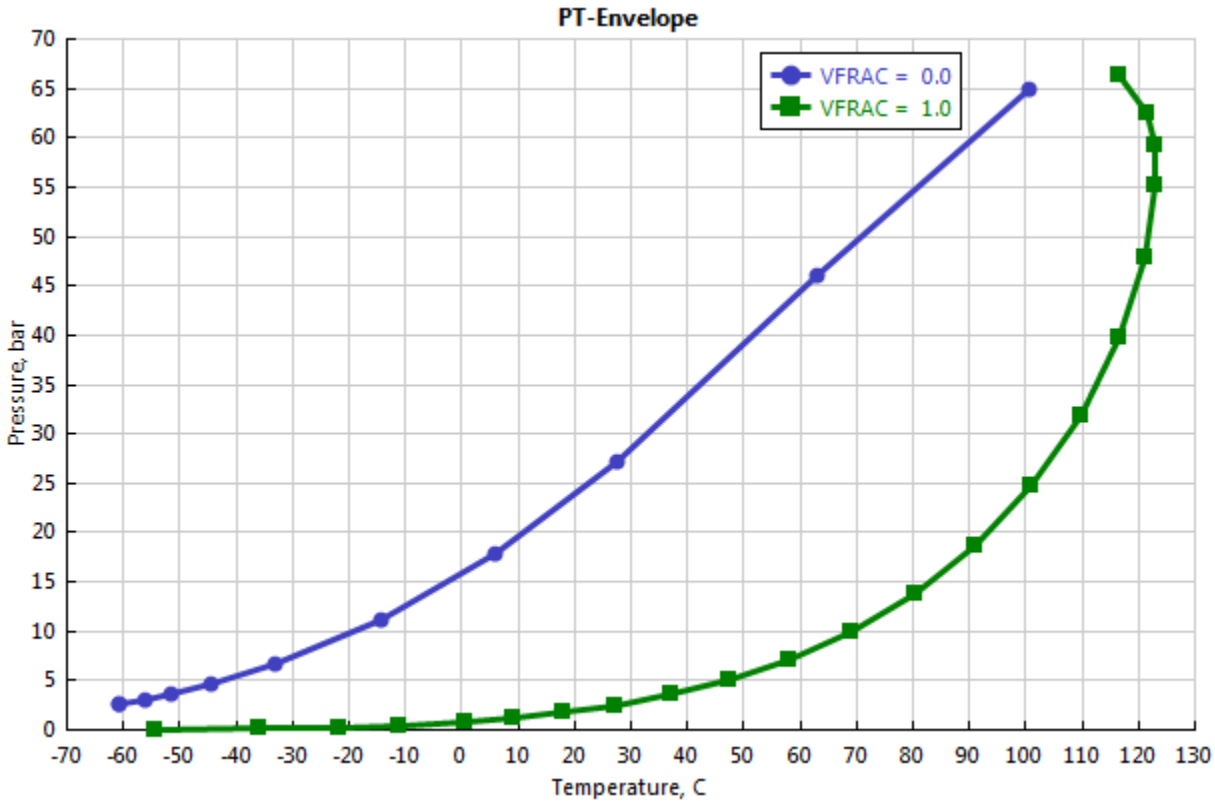
4.04. On the **Home** tab of the ribbon, click the **Analysis | PT-Envelope** button.



4.05. The **Analysis | PTENV-1 | Input | System** sheet is displayed. Select **Mass** from the drop-down list and confirm that the unit is **kg/hr**. Enter **50** and **50** for **ETHANE** and **PENTANE** value fields, respectively. In the **Optional specifications** frame, enter **100** for **Maximum points**.



4.06. Click the **Run analysis** button. The PT envelope for the ethane/n-pentane mixture is generated. Note that the green line represents saturated liquid and the blue line represents saturated vapor. The area between the lines represents the 2-phase region.



5. Conclusions

With the PT envelope of a mixture, we can determine its phase conditions for a given temperature and pressure.

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