Sulphur Converters

The SRU Converter is the heart of the unit. This is where H_2S and SO_2 are converted to elemental Sulphur with a side product of water. Inside of the converter vessel is a catalyst to enhance the reaction rate. This catalyst can be composed of a number of different materials, but is most commonly activated Alumina. Titania is also frequently used to ensure a more complete COS and CS_2 hydrolysis in the first converter due to its higher reactivity towards COS and CS_2 at lower temperatures when compared with Alumina.

In SulphurPro™, the converter (Figure 1) is modelled with kinetic rates in order to determine the extent of equilibrium for the Claus reaction as well as COS and CS_2 hydrolysis. This allows the user to simply input details that would be readily available rather than have to guess the equilibrium or conversion values.

Figure 1: Sulphur Converter in SulphurPro™

When the Converter dialog is opened, the first tab is *Converter Data*. This is where thermal and pressure information about the converter is input as shown in Figure 2. Heat duty (Input, +'ve or Removal, –'ve) is typically entered as 0. This corresponds to an adiabatic reactor where no external heat is being applied or removed.
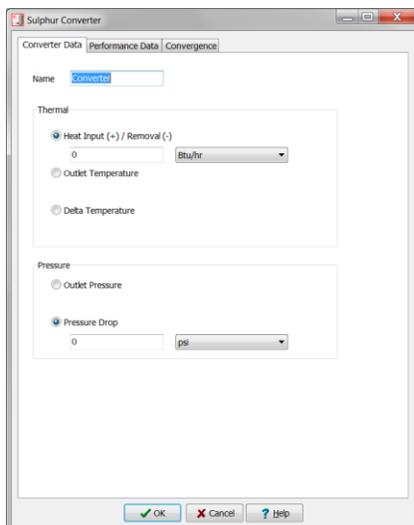

Figure 2. Converter Data Tab Dialog

The next tab is *Performance Data* and is where the details about the catalyst are entered, as seen in Figure 3.
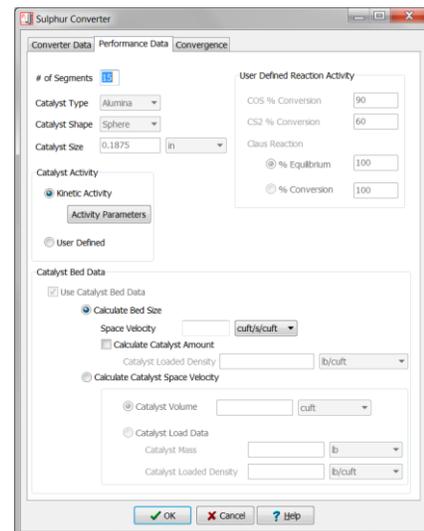

Figure 3. Performance Data Tab Dialog

This block is able to segment the catalyst bed into either equal volume or equal duty pieces. Each segment reports important data such as the temperature of the process gas as well as the dew point temperature, with the ability to graph this information, in Excel, as profiles. *Catalyst Type, Shape, and Size* are all set to model 3/16-inch activated Alumina spheres. The catalyst activity can either be set to kinetic, or user defined. *Kinetic* allows SulphurPro to calculate the rates based on catalyst details shown in the *Catalyst Bed Data* section of this tab where the user inputs either a space velocity, the volume of catalyst, or catalyst load data. *User Defined* allows the user to manually input the reaction rates.

PROTIP: *User Defined* allows the user to model different types of catalyst, such as Titania, by inputting conversion values for COS and CS_2.

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