KM 331 PROSES BENZETİM PROGRAMLARI
DERS NOTLARI [1-4]

Kaynaklar

1. Chemcad User Guide and Tutorial, Chemstations, Inc. Version 6.1.
2. Aspen Technology, Inc., Apsen HYSYS ® Version 7.
3. ChemCad Eğitim Notları , Chemstations, Inc- Houston,TX,USA.
4. A Guide for Getting Started in Aspen HYSYS
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Aspen HYSYS Heat Exchanger

This chapter begins with a problem to find the flowrate of the cold stream passing through the heat exchanger at the given stream conditions. In this chapter, HYSYS's shell and tube heat exchanger will be used to model the process. The heat exchanger performs two-sided energy and material balance calculations. The heat exchanger is very flexible, and can solve for temperatures, pressures, heat flows (including heat loss and heat leak), material streams flows, or UA.

In HYSYS, you can choose the Heat Exchanger Model for your analysis. Your choices include an End Point analysis design model, an ideal (Ft=1) counter-current Weighted designed model, a steady state rating method, and a dynamic rating method for use in dynamic simulations. The dynamic rating method is available as either a Basic or Detailed model, and can also be used in Steady State mode for Heat Exchanger rating.

Learning Outcomes: At the end of this chapter, the user will be able to:

- Operate a heat exchanger operation in HYSYS to model the heat transfer process

Prerequisites: Before beginning this chapter, the users need to know how to:

- Start HYSYS
- Select components
- Define and select a fluid package
- Add and specify material streams

Problem Statement

Hot water at 250°C and 1000 psig is used to heat a cold stream of water in a shell and tube heat exchanger. The inlet temperature and pressure of the cold stream is 25°C and 130 psig, respectively. The outlet temperatures of the cold and hot streams are 150°C and 190°C, respectively. If the flow rate of the hot stream is 100 kg/h, determine the flow rate of the cold stream passing through the exchanger.

Solution Outline

1. Use HYSYS' shell and tube heat exchanger to model the process.
2. Define the inlet and outlet conditions for the streams as given in the problem statement.
3. Obtain the mass flowrate of the cold stream.

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Building the Simulation

1. Defining components list and fluid package
2. Adding streams and unit operation

Defining the Simulation Basis

1. Enter the following values in the specified fluid package view:

On this page…	Select…
Property Package	Peng-Robinson
Components	H_2O

2. Click the **Enter Simulation Environment** button when you are ready to start building the simulation.

Adding a Feed Stream

Add a new **Material** stream with the following values.

In this cell…	Enter…
Name	Tube in
Temperature	250°C
Pressure	1000 psig
Mass Flow	100 kg/h
Compositions	H_2O – 100%

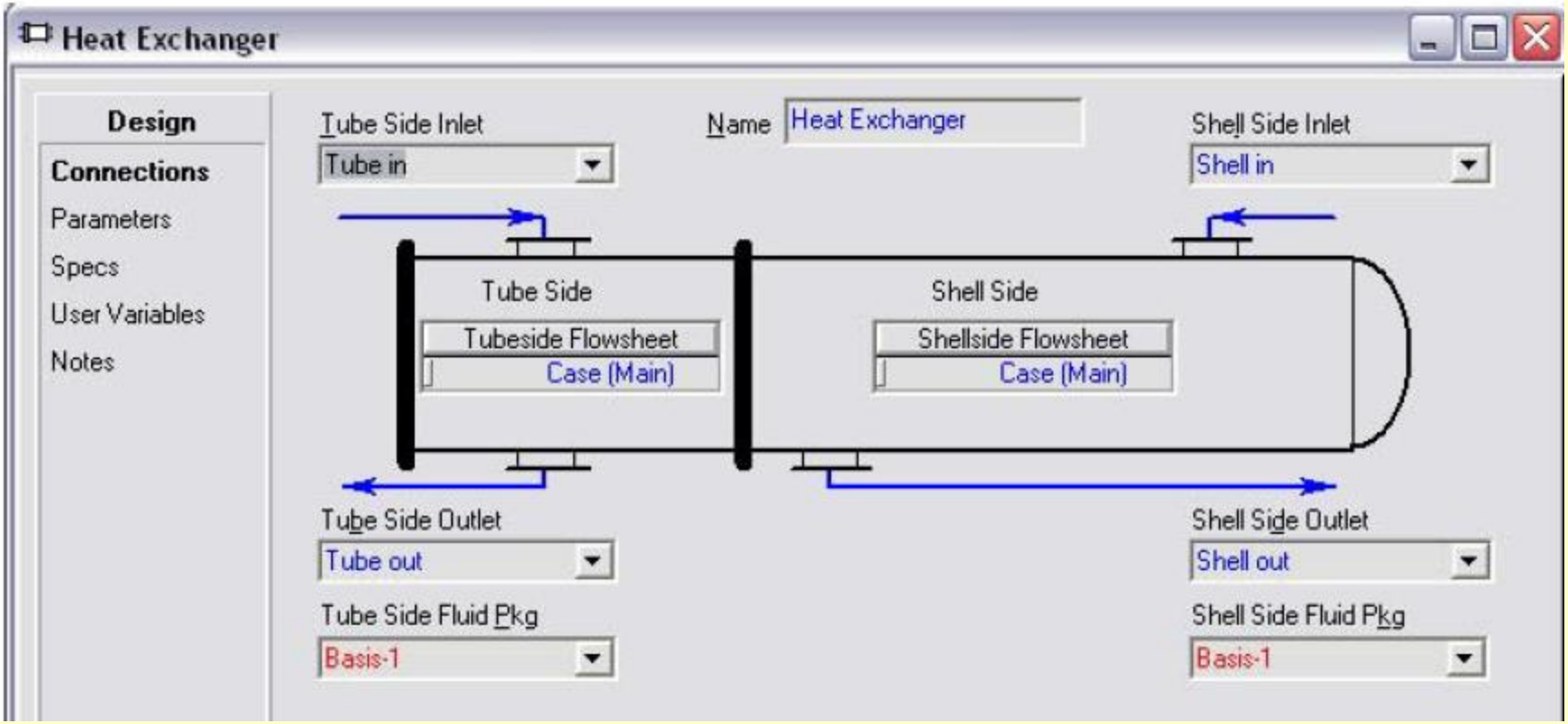
Add another new **Material** stream with the following values.

In this cell…	Enter…
Name	Shell in
Temperature	25°C
Pressure	130 psig
Compositions	H_2O – 100%

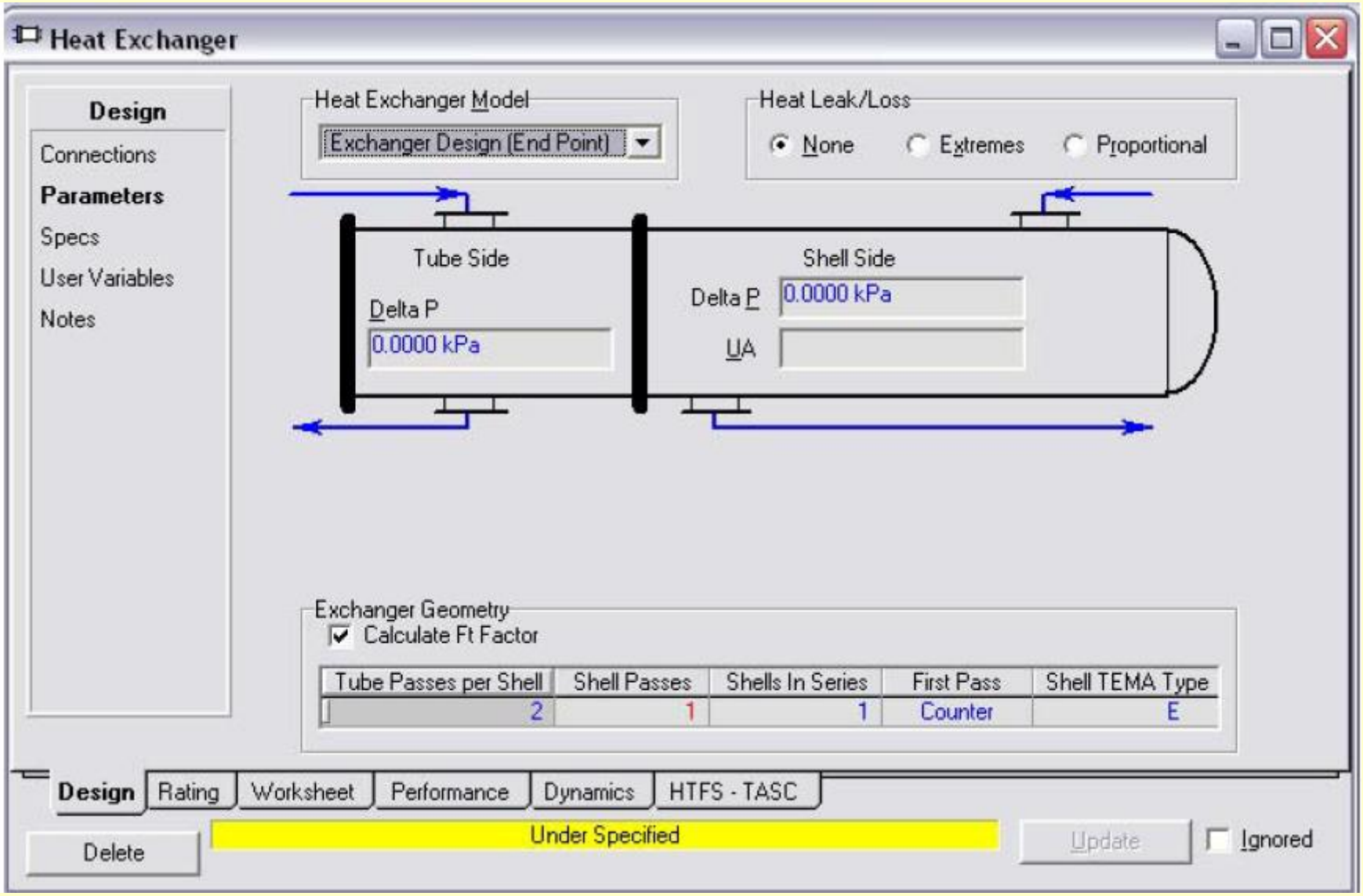
6.6 Adding a Heat Exchanger

The heat exchanger performs two-sided energy and material balance calculations. The hea exchanger is capable of solving the temperatures, pressures, heat flows (including heat loss and heat leak), material stream flows, and UA.

1. Double-click on the **Heat Exchanger** button on the **Object Palette**.
2. On the **Connections** page, enter the following information:



3. Switch to the **Parameters** page. Complete the page as shown in the Figure The pressure drops for the Tube and Shell sides, will be 0 kPa.



4. Go to the **Worksheet** tab. On the **Conditions** page, complete the page as shown in the following figure. The temperature for Shell out and Tube out will be 150°C and 190°C, respectively.