

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., Aspen 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 Pompa Tasarımı

The Pump operation is used to increase the pressure of an inlet liquid stream. Depending on the information specified, the Pump calculates either an unknown pressure, temperature or pump efficiency.

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

- Operate a pump operation in HYSYS to model the pumping process
- Connect streams to unit operations
- Determine the pump efficiency and outlet temperature

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

Pumps are used to move liquids. The pump increases the pressure of the liquid. Water at 120°C and 3 bar is fed into a pump that has only 10% efficiency. The flowrate of the water is 100 kgmole/h and its outlet pressure from the pump is 84 bar. Using Peng-Robinson equation of state as a fluid package, determine the outlet temperature of the water.

Building the Simulation

The first step in building any simulation is defining the fluid package. A brief review on how to define a fluid package and install streams is described below. *For a complete description, see Chapter 1: Starting with HYSYS.*

Accessing HYSYS

To start HYSYS:

1. Click on the **Start** menu.
2. Select **Programs | AspenTech | Aspen Engineering Suite | Aspen HYSYS 2004.1 | Aspen HYSYS 2004.1.**

Open a new case by using one of the following:

1. Go to the **File** menu, select **New**, followed by **Case**, or
2. Press **Ctrl N**, or
3. Click the **New** icon on the toolbar.

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 ₂ O

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

Installing a Stream

There are several ways to create stream:

- Press **F11**. The Stream property view appears, or
- Double-click the **Stream** icon in the **Object Palette**.

Defining Necessary Streams

Add a stream with the following values.

In this cell...	Enter...
Name	Feed
Composition	H ₂ O – 100%
Molar Flow	100 kgmole/h
Temperature	120°C
Pressure	3 bar

Add a second stream with the following properties.

In this cell...	Enter...
Name	Outlet
Pressure	84 bar

Adding Unit Operations

1. There are a variety of ways to add unit operations in HYSYS:

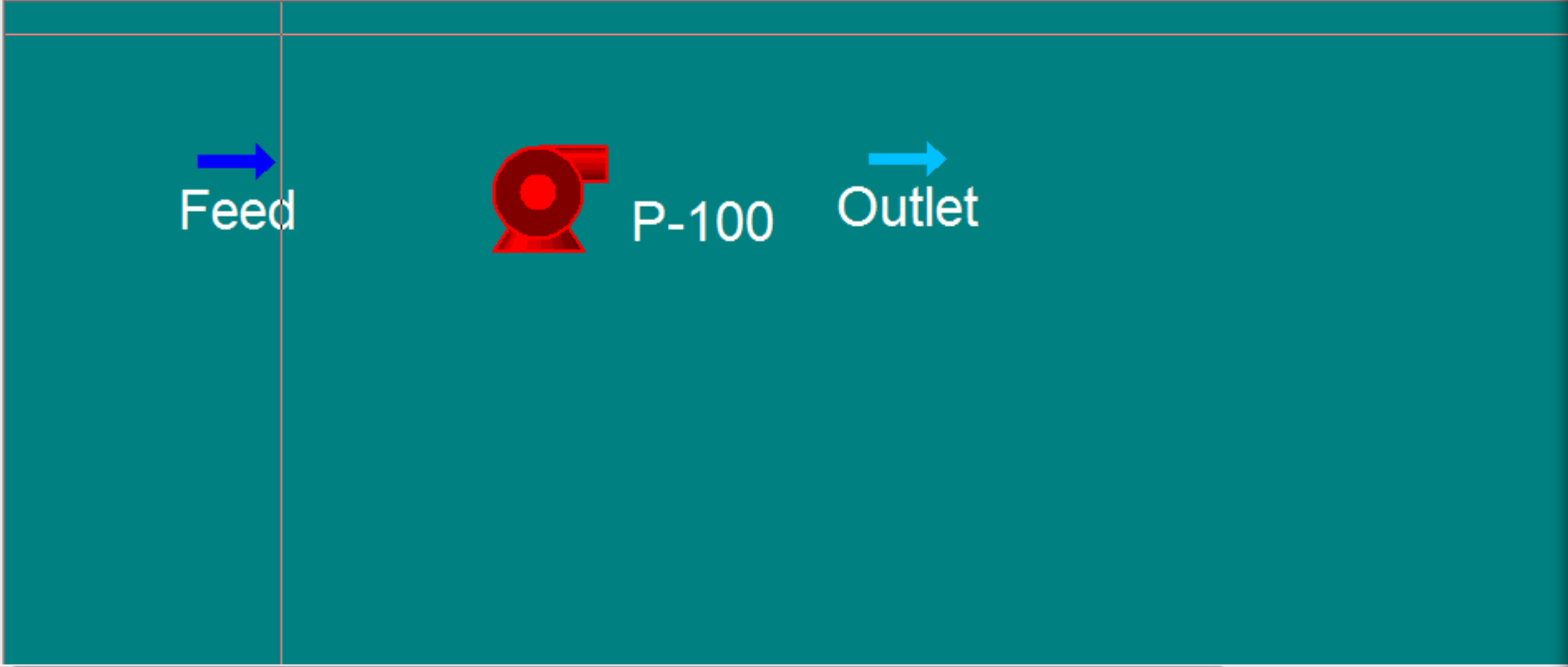
To use the...	Do this...
Menu Bar	From the Flowsheet menu, select Add Operation or Press F12 . The UnitOps view appears.
Workbook	Open the Workbook and go to the UnitOps page, then click the Add UnitOp button. The UnitOps view appears.
Object Palette	From the Flowsheet menu, select Open object Palette , or press F4 . Double-click the icon of the operation you want to add.
PFD/Object Palette	Using the right mouse button, drag 'n' drop the icon from the Object Palette to the PFD.

ornek1.hsc - HYSYS 3.2

File Edit Simulation Flowsheet PFD Tools Window Help

Environment: Case
Mode: Stead

PFD - Case (Main)



Feed P-100 Outlet

Required Info : P-100 -- Requires a feed stream
Required Info : P-100 -- Requires a product stream

Case (Main)

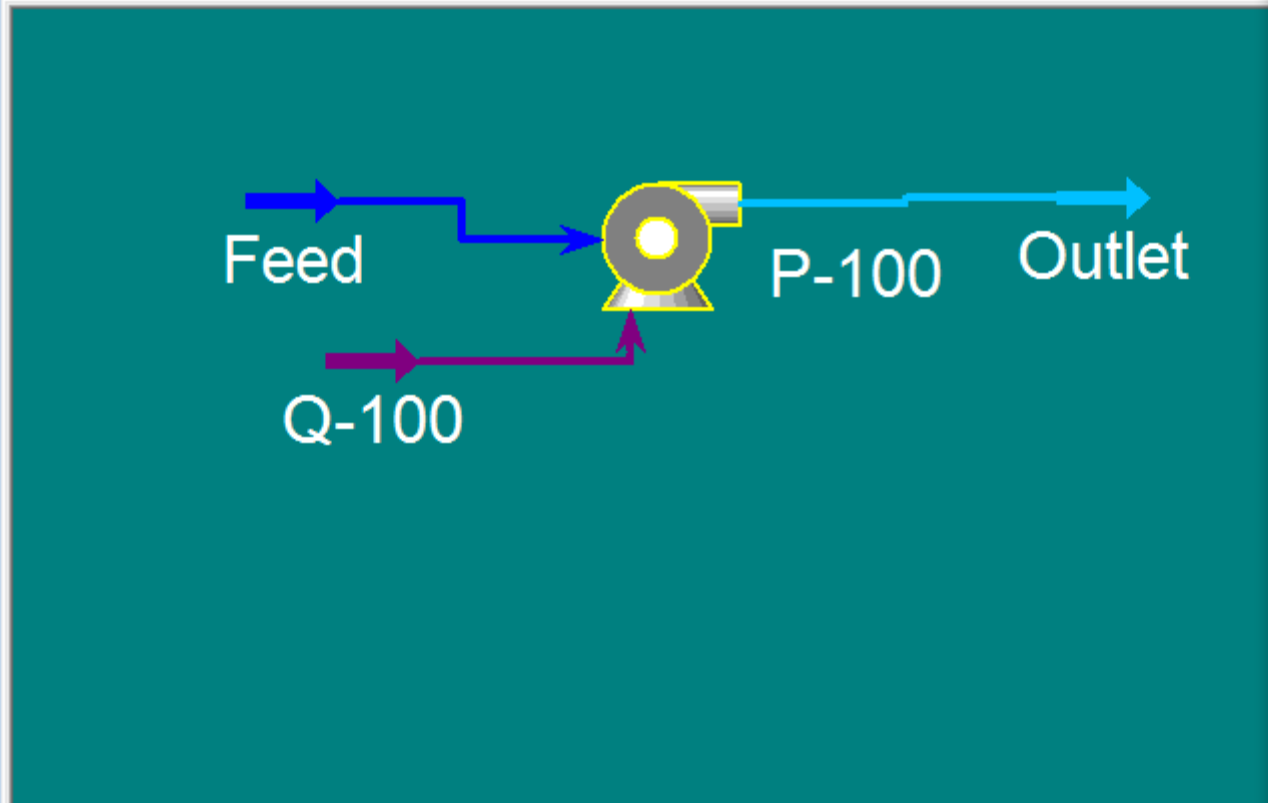
Tools palette containing various process units and symbols.

Connecting Pump with streams

The screenshot shows a software window titled "P-100" with a "Design" tab selected. The window contains a central pump icon with a blue arrow pointing into it from the left, labeled "Inlet", and another blue arrow pointing out to the right, labeled "Outlet". A red arrow labeled "Energy" points to the bottom of the pump. Below the pump are two dropdown menus: "Energy" and "Fluid Package", with "Basis-1" selected in the latter. The "Design" tab is active, and the "Rating" tab is also visible. At the bottom, there is a "Delete" button and a red bar with the text "Requires a feed stream". To the right of the red bar are two checkboxes: "On" (checked) and "Ignored" (unchecked).



PFD - Case (Main)



Case (Main)

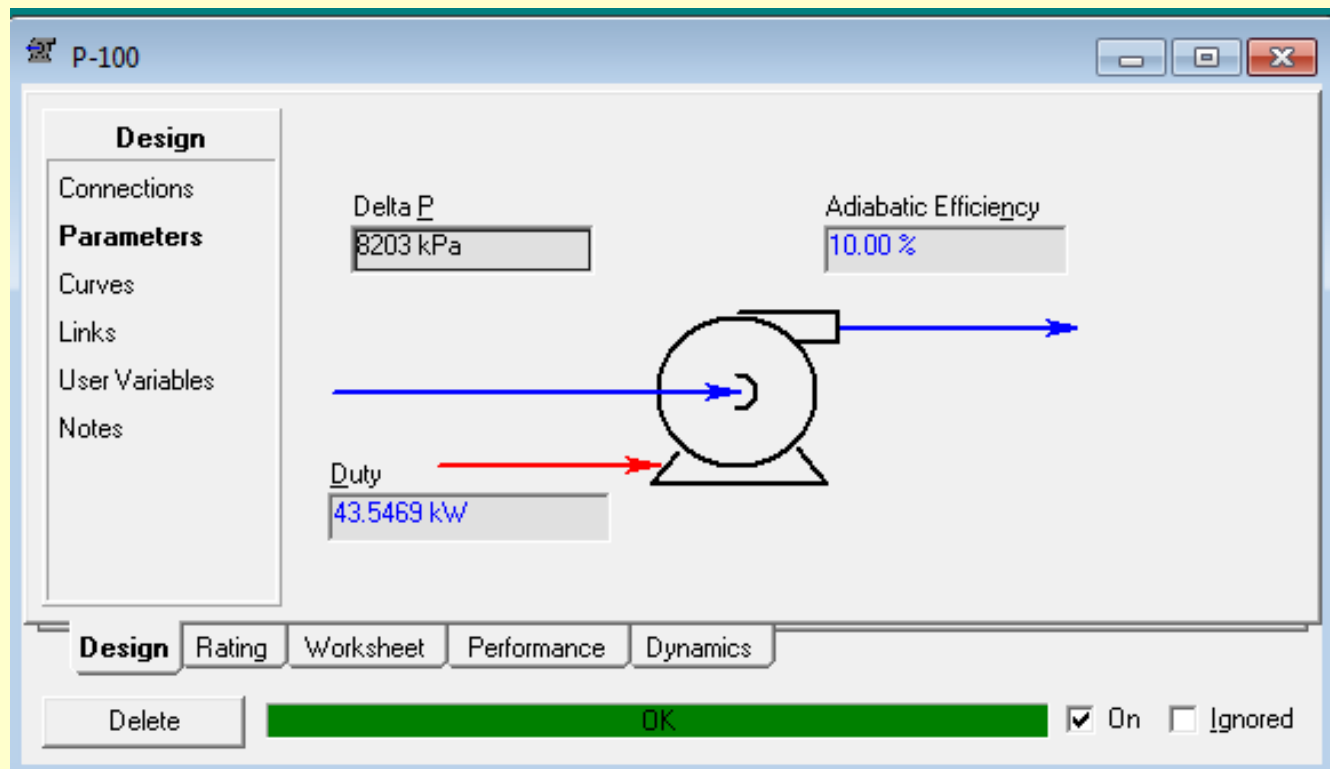
This vertical toolbar contains a wide variety of icons for different process units. At the top, there are icons for locking and unlocking, and for flow direction. Below these are numerous icons for pumps, heat exchangers, distillation columns, reactors, and other specialized equipment. At the bottom of the toolbar, there are sections labeled 'FLOW SHEET' and 'CUSTOM COLUMN'.

Optional Info : Q-100 -- Unknown Heat Flow
Optional Info : Q-100 -- Not Solved

Specifying the Pump Efficiency

Default efficiency for the pump is **75%**. To change the efficiency, do the following:

1. Click on the **Design** tab of the pump window.
2. Then click on **Parameters**.
3. In the **Adiabatic Efficiency** box on the parameters page, enter **10**. The units should be in per cent as shown in Figure 3-5.



After the efficiency is entered the streams of the pumps should be solved. Click on the **Worksheet** tab to view the results as shown

The screenshot shows a software window titled "Workbook - Case (Main)". The main area contains a table with the following data:

Name	Feed	Outlet	** New **
Vapour Fraction	0.0000	0.0000	
Temperature [C]	120.0	139.2	
Pressure [bar]	3.000	85.03	
Molar Flow [kgmole/h]	100.0	100.0	
Mass Flow [kg/h]	1802	1802	
Liquid Volume Flow [USGPM]	7.948	7.948	
Heat Flow [kW]	-7714	-7670	

Below the table are four tabs: "Material Streams", "Compositions", "Energy Streams", and "Unit Ops". The "Material Streams" tab is active and shows a list of streams: "FeederBlock_Feed" and "P-100".

On the right side of the "Material Streams" tab, there are several options:

- Fluid Pkg: All (dropdown menu)
- Include Sub-Flowsheets
- Show Name Only
- Number of Hidden Objects: 0

At the bottom left, there is a checked checkbox for "Horizontal Matrix".