Heat Exchanger

Spoken Tutorial Project
http://spoken-tutorial.org

National Mission on Education through ICT
http://sakshat.ac.in

Kaushik Datta & Priyam Nayak
IIT Bombay

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In this tutorial, we will learn to:

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- **Simulate a Heat Exchanger**

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- **Simulate a Heat Exchanger**
- **Calculate the Outlet stream temperatures**

Learning Objectives

In this tutorial, we will learn to:

- **Simulate a Heat Exchanger**
- **Calculate the Outlet stream temperatures**
- **Calculate Thermal Efficiency and LMTD**

System Requirement

- **DWSIM v 4.3**

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- **Windows 7**

- DWSIM v **4.3**
- Windows **7**
- Any OS: Linux, Mac OS X or FOSSEE OS on ARM

To practice this tutorial, you should know

Prerequisites

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- **Add material stream and specify their properties**

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- **http://spoken-tutorial.org**
- **You can access these tutorials and all the associated files from this site**

Compounds and Inlet stream conditions

Compounds	Water, Methanol	
Inlet Streams	Cold(H_2O)	Hot(CH_3OH)
Mass Flow	15000 kg/h	25000 kg/h
Mole Fraction	$x_{CH_3OH} = 0$	$x_{CH_3OH} = 1$
Mole Fraction	$x_{H_2O} = 1$	$x_{H_2O} = 0$
Temperature	$10\,^{\circ}C$	$80\,^{\circ}C$
Pressure	1 bar	5 bar

Heat Exchanger Properties and Property Package

Flow type	Counter Current
Overall HT Coefficient	450 W/[m^2.K]
Heat Exchanger Area	250 m^2
Cold Fluid Pressure Drop	0.002 bar
Hot Fluid Pressure Drop	0.025 bar
Package	Raoult's Law

Summary

In this tutorial, we have learnt to:

- **Simulate a Heat Exchanger**
- **Calculate the Outlet stream temperatures**
- **Calculate Thermal Efficiency and LMTD**

Assignment

Compounds	Toluene, Acetone	
Inlet Streams	Cold(C_7H_8)	Hot(C_3H_6O)
Mass Flow	30000 lb/hr	15000 lb/hr
Mole Fraction	$x_{C_3H_6O} = 0$	$x_{C_3H_6O} = 1$
Mole Fraction	$x_{C_7H_8} = 1$	$x_{C_7H_8} = 0$
Temperature	$100\,^{\circ}\text{F}$	$200\,^{\circ}\text{F}$
Pressure	1 bar	5 bar

Assignment

Flow type	Counter Current
Overall HT Coefficient	270 W/[m^2.K]
Heat Exchanger Area	75 m^2
Cold Fluid Pressure Drop	0.0035 bar
Hot Fluid Pressure Drop	0.0025 bar
Package	Raoult's Law

About the Spoken Tutorial Project

- Watch the video available at
  http://spoken-tutorial.org
  [/What_is_a_Spoken_Tutorial](http://spoken-tutorial.org/What_is_a_Spoken_Tutorial)
- It summarises the Spoken Tutorial
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Spoken Tutorial Workshops

The Spoken Tutorial Project Team,

- **Conducts workshops using spoken tutorials**

- **Gives certificates to those who pass an online test**

- **For more details, please write to contact@spoken-tutorial.org**

Forum for specific questions

- Do you have questions in this Spoken Tutorial?
- Please visit http://forums.spoken-tutorial.org
- Choose the minute and second where you have the question
- Explain your question briefly
- Someone from the FOSSEE team will answer them

DWSIM Flowsheeting Project

- **The FOSSEE team coordinates conversion of existing flow sheets**

- **We give honorarium and certificates for those who do this**

- **For more details, please visit this site http://dwsim.fossee.in/flowsheeting-project**

Textbook Companion Project

- **The FOSSEE team coordinates coding of solved examples of popular books**

- **We give honorarium and certificates for those who do this**

- **For more details, please visit this site http://dwsim.fossee.in/textbook-companion-project**

Lab Migration Project

- **The FOSSEE team helps migrate commercial simulator labs to DWSIM**

- **We give honorarium and certificates for those who do this**

- **For more details, please visit this site http://dwsim.fossee.in/lab-migration-project**

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Thanks

- **Thanks for joining**