

Chemsep Distillation Column

Spoken Tutorial Project
<https://spoken-tutorial.org>

National Mission on Education through ICT
<https://sakshat.ac.in>

Kaushik Datta & Priyam Nayak
IIT Bombay

18 December 2019



Learning Objectives



Learning Objectives

In this tutorial, we will learn to:



Learning Objectives

In this tutorial, we will learn to:

- **Specify properties of a Chemsep column**



Learning Objectives

In this tutorial, we will learn to:

- Specify properties of a Chemsep column
- **Simulate a Distillation column**



System Requirement



System Requirement

- **DWSIM v 5.8 (Classic UI) Update 3**



System Requirement

- DWSIM v 5.8 (Classic UI) Update 3
- **Windows 10 OS**



System Requirement

- DWSIM v 5.8 (Classic UI) Update 3
- Windows 10 OS
- **Any OS: Linux, Mac OS X or FOSSEE OS on ARM**



Prerequisites



Prerequisites

To practice this tutorial, you should know to



Prerequisites

To practice this tutorial, you should know to

- **Add components to a flowsheet**



Prerequisites

To practice this tutorial, you should know to

- Add components to a flowsheet
- **Select thermodynamic packages**



Prerequisites

To practice this tutorial, you should know to

- Add components to a flowsheet
- Select thermodynamic packages
- **Add material and energy streams and specify their properties**



Prerequisite Tutorials and Files

- <https://spoken-tutorial.org>



Prerequisite Tutorials and Files

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



Code Files



Code Files

- **DWSIM-Chemsep** file used in the tutorial is provided as a Code file on this tutorial page



Code Files

- **DWSIM-Chemsep** file used in the tutorial is provided as a Code file on this tutorial page
- **Download the file from Code Files link**



Compounds and Inlet Conditions

Compounds	Furfural, Ethyl Acetate	
Basis	UNIFAC	
Feed	Molar Flow	616.177 mol/s
	Temperature	397 K
	Pressure	101325 Pa
	Mole fractions	Furfural= 0.879 Ethyl Acetate= 0.121



Citation



An, Yi, et al. “Design/optimization of energy-saving extractive distillation process by combining preconcentration column and extractive distillation column” *Chemical Engineering Science* 135 (2015): 166-178



Summary

- Specify properties of a Chemsep column
- Simulate a Distillation column



Assignment

Compounds	Benzene, Toluene	
Thermodynamics	Raoult's law	
Feed	Flow rate	100 Kmol/h
	Temperature	397 K
	Pressure	101325 Pa
	Mole fractions	$C_6H_6 = 0.6$
		$C_7H_8 = 0.4$



Column Configuration

Parameter	Value
Number of stages	20
Feed Stage	10
Reflux Ratio	2.3
Mole Fraction in Bottoms(C_6H_6)	0.01



About the Spoken Tutorial Project

- Watch the video available at https://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- It summarises the Spoken Tutorial project



About the Spoken Tutorial Project

- Watch the video available at https://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- It summarises the Spoken Tutorial project
- If you do not have good bandwidth, you can download and watch it



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 <https://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 flowsheets
- We give honorarium and certificates for those who do this
- For more details, please visit this site <https://dwsim.fossee.in/flowsheeting-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 <https://dwsim.fossee.in/lab-migration-project>



Acknowledgements

- **Spoken Tutorial and FOSSEE projects are funded by NMEICT, MHRD, Government of India**



Thanks

- Thanks for joining

