

GLOSSARY

Azeotrope : A liquid mixture with constant boiling point as both exhibits the same concentration of vapor and liquid phase at a certain point of temperature.

Binary Mixture : A chemical blend of two different liquid components which are miscible in one another.

Evaporation Rate : The kinematics at which substance will undergo a phase change from liquid to vapor, or also known as evaporation.

Separation Factor : Often known as selectivity, is a measure of how efficiently a separation process has occurred and can be determined by the ratio of component in the permeate to the retentate.

Spray Distillation : A new method of distillation which makes use of less energy consumption due to low temperature used and can be used to separate azeotrope binary mixture as it utilizes the principle of diffusion based on the mixtures' volatility.

Volatile Compound(s) : Compound(s) that can undergo evaporation easily.

NOMENCLATURE

α	Separation Factor	Γ_i	Thermodynamic factor of activity coefficient for vapor-liquid equilibrium
V_d	Settling velocity of dispersed droplet (ms^{-1})	j_i	Independent diffusion of mixture according to molar flow of each component
$\Delta\rho$	Difference in density between the mixture's liquid phases (kg/m^3)	μ_i^0	Chemical potential of i in state of reference
D_d	Droplet size diameter (m)	∂_i	Activity of i
μ_c	Dynamic viscosity at continuous phase ($\text{kgm}^{-1}\text{s}^{-1}$)	γ_i	Activity coefficient of i
G	Gravitational force (ms^{-2})	x_i	Atomic fraction of i
D_i	Internal (Einstein) diffusion coefficient	K_B	Boltzmann constant
\bar{G}_i	Partial Gibbs energy	D_z, D_y	Mass-Transfer coefficients
D_{ef}	Effective Coefficient of Longitudinal Diffusion	\bar{W}, W	Average and local flow velocity
c	Concentration of each component	d	Flow width
R	Cylindrical channel radius	$f_1(r), f_2(r)$	Distributions of local flow velocity
D_r	Radial Diffusion Coefficient	v	Local flow velocity
ΔW	Equilibrium flow velocity distribution	f_0	Distribution Coefficient based on the apparatus' cross section
ρ	Fluid density	p	Fluid Pressure

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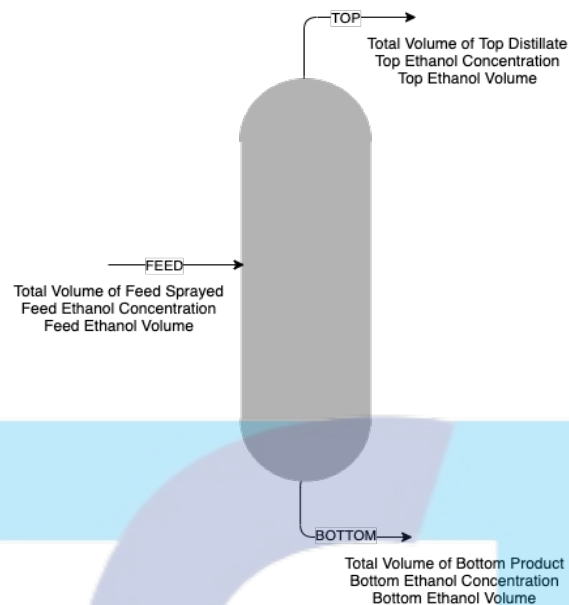
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APPENDICES

Appendix 1. Spray Distillation Unit Mass Balance Computation



To compute for the mass balance, a known data for the following are needed:

1. Initial Feed Volume
2. Feed Lost Volume
3. Residual Feed Volume
4. Feed Concentration
5. Bottom Volume
6. Bottom Concentration

Feed

Total Volume of Feed Sprayed

$$= \text{Initial Feed Volume} - (\text{Volume of Feed Loss} + \text{Volume of Residual Feed})$$

$$\text{Feed Ethanol Volume} = \text{Sprayed Feed Volume} \times \text{Feed Concentration}$$

Top

$$\text{Total Volume of Top Distillate} = \text{Total Volume of Feed Sprayed} - \text{Total Volume of Bottom Product}$$

$$\text{Top Ethanol Volume} = \text{Feed Ethanol Volume} - \text{Bottom Ethanol Volume}$$

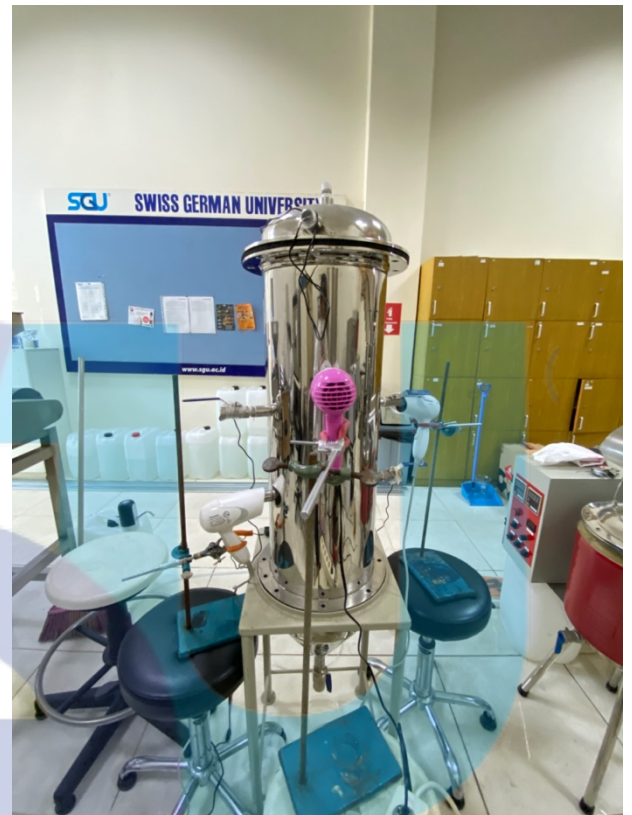
$$\text{Top Ethanol Concentration} = \frac{\text{Feed Ethanol Volume}}{\text{Total Volume of Top Distillate}} \times 100\%$$

Appendix 2. Actual Operating Set-Up of Model C Unit Testing

Front View



Back View



CURRICULUM VITAE



ANNISYA RAINY PUTRI S.T., B. Eng

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Achievements

KEMENDIKBUD "Most Outstanding Student" (PILMAPRES)

- Rank 1st in University Rayon III Area of Tangerang Raya | March 2019
- Rank 3rd in LLDIKTI IV Area (Banten and West Java) | April 2019
- Recognized as one of the top 7 chosen to move forward as national finalists with the given rankings out of 51 competing participants.

Swiss German University Best Grade Scholarship

- Earned Best Grade Scholarship for performances in 2nd, 3rd, 4th, 5th, 7th semester
- Received 50% Scholarship for Development Fee + 1st Semester

Skills

- Process Equipment Design, Heat & Fluid Transfer, Unit Operation, Separation Technology, Plant Operation Safety, Plant Design, Graphic Design
- Softwares: TeBIS System A, Microsoft Office, Adobe Photoshop
- Soft Skills: Public Speaking, Time Management, Collaborative Work
- Languages:
Indonesian (Native/Bilingual Proficiency)
English (Native/Bilingual Proficiency)
German (Elementary Level)

Organisation Experiences

Swiss German University Student Board of Executives (BEM) | 2018 - 2019
Position: President

Swiss German University Association of Chemical Engineering Students | 2018 - 2019
| 2018 - 2019
Position: Secretary

Swiss German University Student Board of Executives (BEM) | 2017 - 2018
Position: Secretary/Member of Education Division

Career Objective

I am a hard-working and enthusiastic fresh graduate on the lookout for ways to challenge myself outside of my comfort zone in a positive environment to start my career.

Work Experiences

Documentation Intern at Bayer AG Bergkamen, Germany

March - August 2020

- Attended professional training on Laboratory, Rührwerk and Druckfilter utilization in the industry
- Processed, computed, and analyzed numerical and graphical data of production process using te-BIS system A
- Took part in products electronic batch records projects
- Reviewed and revised product production documents and standard operating procedures
- Prepared documents for company energy audit

Process Development Intern PT Bayer Indonesia Cimanggis Plant, Indonesia

December 2018 - February 2019

- Worked on drug pilot production projects
- Organized timeline and gathered information for product development projects
- Sorted out warehouse storage system
- Analyzed production process data using Minitab
- Created and modified current and existing product batch records
- Translated production documents from Indonesian to English

Educational Background

Fachhochschule Südwestfalen | Soest, Germany

Bachelor of Engineering (2020)

- Double Degree Exchange Program
- Study Program: Wirtschaftsingenieurwesen/Industrial Engineering

Swiss German University | Tangerang, Indonesia

Bachelor of Engineering (2017 - 2021)

- Expected Graduation: September 2021
- cGPA: 3.84/4.00
- Study Program: Pharmaceutical Chemical Engineering

Bogor Raya High School

2015 - 2017

- Cambridge Science A/AS Level Pathway