

Chapter III: Simulation of gas-liquid, liquid-liquid contactors and liquid-solid

III-1- Introduction

Within the realm of chemical engineering, the simulation and comprehension of absorption/stripping phenomena, including those with chemical reactions, and the processes of liquid-liquid and liquid-solid extraction stand as pivotal pillars for numerous industrial applications. This chapter embarks on an exploration of these specific aspects, utilizing the powerful simulation capabilities of Aspen Hysys, a preeminent software tool widely acclaimed in the field of chemical engineering.

Focused primarily on absorption/stripping phenomena, these processes involve the transfer of components between gas and liquid phases, often incorporating chemical reactions. Aspen Hysys serves as an invaluable platform for understanding and optimizing these intricate systems, enabling engineers to delve into the intricacies of mass transfer, phase equilibrium, and the effects of chemical reactions on the overall process dynamics.

Additionally, this chapter encompasses the simulation of liquid-liquid and liquidsolid extraction processes. Liquid-liquid extraction involves the selective transfer of components between two immiscible liquid phases, crucial in industries such as pharmaceuticals, petrochemicals, and environmental engineering. Likewise, liquidsolid extraction plays a vital role in separating target compounds from solid matrices in diverse applications, including pharmaceuticals, food processing, and wastewater treatment.

Aspen Hysys stands out as an exceptional simulation tool that integrates advanced thermodynamic models, mass transfer correlations, and comprehensive unit operation models. Through its capabilities, engineers can accurately model the behavior of these contactors, predict performance under varying conditions, and optimize the design and operational parameters without extensive reliance on costly experimental trials.

Throughout this chapter, the focus remains dedicated to elucidating the methodologies, tools, and features within Aspen Hysys, specifically tailored for



simulating absorption/stripping processes with and without chemical reactions, as well as liquid-liquid and liquid-solid extraction. From defining initial parameters to integrating complex chemical kinetics and interpreting simulation outcomes, this chapter endeavors to provide engineers and researchers with a thorough guide to harnessing Aspen Hysys' capabilities in these critical separation processes.

In conclusion, the utilization of Aspen Hysys for simulating absorption/stripping processes without and with chemical reactions and liquid-liquid extraction not only facilitates a deeper understanding of these complex systems but also empowers engineers to optimize and innovate within their respective industries. This chapter strives to illuminate the methodologies and strategies essential for leveraging Aspen Hysys in modeling these specific contactors, aiming to equip practitioners with tools for enhanced efficiency and reliability in industrial operations.

III-2- Why Simulation of these columns

The simulation of absorption/stripping phenomena, incorporating chemical reactions, and liquid-liquid extraction processes stands as a critical facet in chemical engineering and industrial applications. Utilizing tools like Aspen Hysys, engineers benefit from comprehensive platforms to model and optimize these intricate separation techniques.

Simulating absorption and stripping columns offers engineers a virtual environment to optimize operating conditions, comprehend complex mass transfer phenomena, and achieve cost-effective design modifications. Aspen Hysys aids in predicting performance variations, considering chemical reactions, and refining phase equilibria, ensuring enhanced efficiency in gas-liquid separation processes.

Similarly, the simulation of liquid-liquid extraction through Aspen Hysys enables engineers to optimize solvent-to-feed ratios, understand interfacial interactions, and design efficient extraction systems. This approach allows for the identification of optimal conditions, leading to improved product purity and higher yields while minimizing solvent usage and energy consumption.

In summary, leveraging Aspen Hysys for simulating absorption/stripping processes with chemical reactions and liquid-liquid extraction empowers engineers to optimize designs, understand complex phenomena, and enhance separation



processes across various industrial sectors.

III-3- Simulation of various Reactors using Aspen Hysys

As mentioned in the previous sections, the next points will give a perfect guide for the users of Aspen Hysys in order to simulate and assess the performances of various mentioned processes

III-3-1- Absorption/Stripping processes

In order to perform these types of simulation, some examples will be taken into consideration, and then numerous steps will be followed in order to resolve them.

Example 1: Separation of SO2 from Air mixture using Absorption column, in which the parameter are as follows:

Solvent (Water, T=20°C, m=60.05 kg/s, p=2 bar)

Flue gas (Mixture "Air: 97mol%, SO2: 3mol%", T=20°C, m=1.717 kg/s, p=2 bar)

Absorber parameters: 20 stages, Top pressure: 1.2 bar, Bottom pressure: 1.5 bar

In order to solve this example, there are numerous steps that should be followed using Aspen Hysys, they can be presented as points as follows:

Launch Aspen HYSYS: Open the Aspen HYSYS software on your computer.





Figure 1. Launch Aspen HYSYS

Create a New Project: Start a new project (case) or open an existing one if you have it. Projects help you organize and save your simulation work.



Figure 2. Open a new case



🕑 i 🔚 🔊 🚍 🗊 🔻 i		Untitled - As	pen HYSYS V8	8.8 - aspenONE				_		×
File Home View Cu	ustomize Resources				Searc	h aspenO	NE Exchang	је	P (☆ 🕜
Cut Copy- Component Lists Fluid Packages	Methods Assistant Reactions User Properties	Map Components	Petroleum Assays	 Hypotheticals Manager Convert Remove Duplicates 						
Clipboard	Component Lists ×	Components	Retining 'a	Hypotheticals	Oli	Options	PVI Data			
Properties	[
All Items •	List Na	me		Source		Asso	ciated Fluid	l Packages		
Component Lists										
Fluid Packages										=
Petroleum Assays										
Reactions										
A Properties										
□-{	<									+ +
Safety Analysis	Messages								,	• 4 ×
🔊 Energy Analysis	Required Info : Fluid I Required Info : Comp Population Info : Marta	Packages Select prop ponents Empty comp or Component List Fr	perty pace ponent li							
	•					100%	Θ	-0-		\oplus

Figure 3. Appeared window after opening a new case or project

Define Component list and Fluid Package: Specify the chemical substances that will take place in the reactor. Also you have to choose the suitable fluid package in order to perform the different associated calculations.

된 🗉 🔚 🤊 🔚 🗊 🕫 I		Untitled -	Aspen HYSYS V	/8.8 - aspenONE					_	\Box \times
File Home View Cu	ustomize Resource	s				Searc	ch aspen(ONE Exch	nange	🔎 🗞 🕜
👗 Cut 📃 👖	left Methods Assistant	K Map Component	s 🔒	🧭 Hypotheticals	Manager	🖪 🖉	2			
Copy- Component Fluid	AB Reactions	🐻 Update Propertie	S Detroloum	み Convert		۴ 🌔				
Paste Lists Packages	🔄 User Properties		Assays	🍫 Remove Duplic	cates	0				
Clipboard Navig	ate	Components	Refining 🖷	Hypothetica	als	Oil	Options	PVT Dat	a	
Properties <	Component List -	1× +								
All Items -										<u>^</u>
🔺 🔯 Component Lists	Source Databank: H	IYSYS						s	elect:	Pure Co
Component List - 1										
Fluid Packages	Component	Tvr	e.	Group]			S	earch for:	SO2
Petroleum Assays			- 							_
Component Maps		H2O Pule C	.omponent						Simula	tion Name
log User Properties		SO2 Pure C	omponent.					-	Sintale	
						< Ad	d			
т										
A Properties										
□ [□] Simulation						Replac	ce			
🔎 Safety Analysis										
_						Remo	ve			
Second Se										۳ ۲
*										
	Messages									
							1009	» Θ	U	• • · · ·

Figure 4. Adding the component list



関 🛛 🔚 🤊 🖃 🗊 🕫	Untitled - A	spen HYSYS V8.8 - aspenONE		- 🗆 X
File Home View Cu Cut Copy- Copy- Component Fluid Packages Clipboard Naviga	stomize Resources Methods Assistant Map Components Reactions Jupicate Properties te Components	Petroleum Assays Refining © Hypotheticals Manager Convert Remove Duplicates Hypotheticals	Search aspenONE E	xchange 🔽 🗞 🝘
Properties <	Basis-1 × +			-
All Items *	Set Up Binary Coeffs StabTest Phase	Order Tabular Notes		<u>^</u>
Component Lists Component List - 1	Package Type: HYSYS	Componer	t List Selection	mponent List - 1 [HYSYS
Basis-1	Property Package Selection	Activity Model Specifications		
Retroleum Assays	Clean Fuels Pka	Vapour Model	Ideal	=
Reactions	CPA	Density Method	Costald	-
Component Maps	Esso Tabular	UNIFAC Estimation Temp	25.0000 C	
Log User Properties	Extended NRTL	Use Poynting Correction	₽	
A Properties	GCEOS General NRTL Glycol Package	No Parameters required for the selected I	Property Package	
다. Simulation	Grayson Streed Kabadi-Danner		roperty ruckage.	
Safety Analysis	Lee-Kesler-Plocker			
🚯 Energy Analysis	Margules MBWR			
	Messages			
			100% Θ	÷:

Figure 5. Choose the fluid package

Go to simulation environment: by clicking on the simulation icon on the down left.

関 । 🔚 🤊 🍀 🚍 🗊 🕫	Untitled - Aspen H	/SYS V8.8 - asper	ONE	Flowsheet			-	- [\times
File Home Economics	Dynamics View	Customize	Resources	Flowsheet/Modify	Format	Search aspenON	E Exchange		<mark>></mark> >	0
Simulation	Economics			Energy		된 Palette	-		×	~
All Items	Capital Cost	Utility Cost	:	Available I	Energy Savi					
Contraction workbook Contraction Contracti	USD	USD/Year	off	MW	% of A	\Rightarrow				
Streams	Flowsheet Case (Ma	in) - Solver Activ	/e × 🕂			Refining				-
Stream Analysis						Dynamics	Upstream			
Equipment Design						Common	Columns	Custo	om	
Data Tables							S S		~~~	
Strip Charts								M	∽ →	
Case Studies						1 📫 🚔 1	🕅 💎	21	5	
↓ Properties										
C Simulation	<				_		Cn(A)			Ť
All Cafety Analysis										
	Messages					╡═╡⊡╬╻		*U +	Ð	1 ×
\delta Energy Analysis										
							V_ pH-V	 *	×.	
Solver (Main) - Ready				,		76% O			\oplus	3





Add Absorber: from the Palette, add an absorber by selecting the absorber you want to simulate.



Figure 8. Add the absorber to the PFD



Set Operating Conditions: Define the operating conditions of the absorber, such as temperature, pressure, and flow rates. These conditions significantly impact the reaction rate and product formation.

🕑 Absorber Column Input Expert					_		×
Column Name T-100							
Top Stage Inlet Water Optional Inlet Streams Stream Inlet Stage << Stream >>	$\frac{1}{2}$ # Stages $n = 20$		Optional Side Draws	Ovhd V Air_pu Top S © Lic © Pu	apour Outlet ure tg. Reflux quid inlet mp-around	•	
			Stream	Туре	Draw Stage		
Bottom Stage Inlet Air_Pol				Bottom Wate	ns Liquid Outlet r_ SO2	•	
Stage Numbering Top Down O Bottom Up							
< Prev Next >		C	onnections (page 1 of	f 3)	Cancel		

Figure 9. Setting the streams in the absorber

🕞 🔚 🤊 🎨 📃 🗊 🗧 Untitled - Aspen HYSYS V8.8 - aspenONE	Flowsheet — 🗌 🗙
File Home 🕑 Absorber Column Input Expert	– 🗆 X 📃 A 🙆
₭ Cut MEA1b	
🗈 Copy - 🖶 Uni	
Paste *	>
Clipboard	Top Stage Pressure
Simulation	1.200 bar rs - Unkno 🕨 💙
All Items	-
Contraction Contra	
InitOps	^
▷ 🔯 Streams	
Stream Analy	
Contraction of the second seco	
Data Tables	
Strip Charts	
A Properties	Bottom Stage Pressure
	1.500 bar
Contraction	>
Safety Analy	
🚯 Energy Analy	, [*]
< Prev Next >	Pressure Profile (page 2 of 3)
Solver (Main) - Ready	132% \ominus 🗌 🕀 🛃 🦽







Figure 11. Complete absorber settings

Design Parame	eters Side Ops	Rating	Worksheet	Performance	Flowsheet	Reactions	Dynamics				
Worksheet				Wa	ater	Air_Po	d l	Air_pure	Water_SO2		
Conditions	H2O				1.0000		0.0000	<empty></empty>	<empty< td=""><td>y></td><td></td></empty<>	y>	
Properties	SO2				0.0000		0.0300	<empty></empty>	<empty< td=""><td>y></td><td></td></empty<>	y >	
Compositions PE Specs	Air				0.0000		0.9700	<empty></empty>	<empty< td=""><td>/></td><td></td></empty<>	/>	

Figure 12. entering the different conditions 1



_

🕞 Column: T-100 / COL1 Fluid Pkg: Basis-1 / General NRTL - Ideal

 \Box \times

Design Parame	eters Side Ops Rating Worksheet Perf	ormance Flowsheet	Reactions Dyna	mics		
Worksheet Conditions	Name	Water @COL1	Air_Pol @COL1	Air_pure @COL1	Water_SO2 @COL1	
Properties	Vapour	0.0000	1.0000	<empty></empty>	<empty></empty>	
PF Specs	Temperature [C]	20.00	20.00	<empty></empty>	<empty></empty>	
	Pressure [bar]	2.000	2.000	1.200	1.500	
	Molar Flow [kgmole/h]	1.200e+004	206.0	<empty></empty>	<empty></empty>	
	Mass Flow [kg/s]	60.05	1.717	<empty></empty>	<empty></empty>	
	Std Ideal Liq Vol Flow [USGPM]	953.7	30.21	<empty></empty>	<empty></empty>	
	Molar Enthalpy [Btu/lbmole]	-1.226e+005	-3894	<empty></empty>	<empty></empty>	
	Molar Entropy [Btu/lbmole-F]	1.260	36.64	<empty></empty>	<empty></empty>	
	Heat Flow [kW]	-9.509e+005	-518.3	<empty></empty>	<empty></empty>	
Delete	Column Environment	Run Res	set	Unconverged		✓ Update Outlets

Figure 13. entering the different conditions 2

Worksheet onditions	Name	Water @COL1	Air_Pol @COL1	Air_pure @COL1	Water_SO2 @COL1	
operties	Vapour	0.0000	1.0000	1.0000	0.0000	
Specs	Temperature [C]	20.00	20.00	20.02	19.95	
	Pressure [bar]	2.000	2.000	1.200	1.500	
	Molar Flow [kgmole/h]	1.200e+004	206.0	200.7	1.201e+004	
	Mass Flow [kg/s]	60.05	1.717	1.602	60.17	
	Std Ideal Liq Vol Flow [USGPM]	953.7	30.21	28.82	955.1	
	Molar Enthalpy [Btu/lbmole]	-1.226e+005	-3894	-2082	-1.226e+005	
	Molar Entropy [Btu/lbmole-F]	1.260	36.64	37.15	1.298	
	Heat Flow [kW]	-9.509e+005	-518.3	-269.9	-9.512e+005	

Figure 14. Click on run and the column will be converged



E Column: T-100	0 / COL1 Fluid Pkg:	Basis-1 / General NRTL - Ideal -	
Design Parame	eters Side Ops R	Rating Worksheet Performance Flowsheet Reactions Dynamics	
Worksheet		Water Air Pol Air pure	
Conditions	H2O	1,0000 0,0000 0,0195 0,9992	
Properties	SO2	0.0000 0.0300 0.0000 0.0005	
Compositions	Air	0.0000 0.9700 0.9805 0.0003	
PF Specs			
Delete	Column B	Environment Run Reset Converged Update Outlets Figure 15. the obtained results 1	Ignored
D 🖶 🔊 (🥰 📰 💿 = I	Untitled - Aspen HYSYS V8.8 - aspenONE Flowsheet —	
File Hom	ne Economics	Dynamics View Customize Resources Flowsheet/Modify Format Search aspenONE Exchange	P & @
Models and Streams	Rotate Flip Horizontal Flip Vertical	Attach Attach	me *
Palette		Flowsheet Tools Hierarchy Display Options Conditional Format	itting
Simulation	<	Capital: USD Utilities: USD/Year C Energy Savings: MW (%) Exchangers	- Unkno 🕨 🔗
All Items	•	Flowsheet Case (Main) - Solver Active X +	
 Workbook UnitOps Streams Stream An Equipmen Model Ana Data Table Strip Chart 	alysis E t Design alysis is ts	Water Air_Pol	^
Properties		Water_SO2 T-100	~
Safety Ana	lysis	Messages	- 4)
ó Energy An	alysis	Completed. Saving case C:\Users\YOUCEF~1\AppData\Local\Temp\Auto save of NoName (0x2a0928).ahc Completed.	DRecovery
olver (Main) - Re	ady	98% 🖸 🗍	+ 🗄

Figure 16. the obtained results 2

These steps provide a general guideline for simulating the absorber column in Aspen HYSYS. However, the specific details and nuances can vary depending on



the type of solvent and the complexity of the process involved. It's essential to consult Aspen HYSYS documentation and resources for more in-depth guidance on using the software effectively.

Example 2: A sour water consisted of 97 mol% of H2O and 2 mol% of Ammonia and 1 mol% of H2S is produced from a crude tower should be stripped, the stream is at 103 °C, and 2.8 bar, with a flowrate of 1 kg/s, the required results is a pure water in which the quantity of Ammonia that doesn't achieve 0.005 mol%, while water recovery at least 99.99 mol%.

The stripper has 8 stages in which the stream entered from the 2^{nd} stage.

The condenser pressure is assumed to be 2 bar, while reboiler pressure is assumed to be 2.1 bar.

In order to solve this example, there are numerous steps that should be followed using Aspen Hysys, they can be presented as points as follows:

Launch Aspen HYSYS: Open the Aspen HYSYS software on your computer.

Ð	l n 🖻					<no documer<="" th=""><th>nt> - Aspen</th><th>HYSYS V8.8 -</th><th>aspenONE</th><th></th><th></th><th></th><th></th><th>_</th><th></th><th>×</th></no>	nt> - Aspen	HYSYS V8.8 -	aspenONE					_		×
File	Custon	nize Reso	urces								Searc	n aspenON	IE Excha	nge	2	۵ 🕜
What's E New	Examples	aspenONE Drive	Training	Models E asp	vents venONE	Announcements Exchange	All Content	Community	Support Center	Check for Updates	Live Chat	Send to Support	? Help			
		Start Using A	spen HYSY	'S										×		
		- ΟΓ - Νι - Νι	ew	Recen		dels simulated le pri May 16 2023 4_5911535236i October 31 202 our projet.hsc April 18 2023 4_5906735086	0284142032 23 144851610	roduction cycle .bin .hsc	hexane.hso							
												100%	Θ —]	• 🕀

Figure 17. Launch Aspen HYSYS



Create a New Project: Start a new project (case) or open an existing one if you have it. Projects help you organize and save your simulation work.

🕒 🗟 ") 🖃 🗊 🔻	<no docum<="" th=""><th>ent> - Aspen HYSYS V8.8 - aspenONE</th><th>-</th><th></th></no>	ent> - Aspen HYSYS V8.8 - aspenONE	-	
File Customize Resource	es and a state of the state of		Search aspenONE Exchange	0 ^ 2
🕸 📴 📄 📗	📁 👫 🔲 📭	- 🔍 🔛 🔬 🔯	, 🤛 🖃	
What's Examples aspenONE To New Drive	raining Models Events Announcement	s All Community Support Check f Content Center Update	or Live Send to Help s Chat Support	
	aspenONE Exchange		×	
Start Using Aspe	en HYSYS		~	
Open	Recent Models			
New	simulated le p May 16 2023	procede de production cyclohexane.hsc		
	4_591153523 October 31 2	6084142032.bin 023		
	our projet.hso April 18 2023	5 1		
	4_590673508	6144851610.hsc		
			100% \Theta 🔤	÷
	1.			
	Figure	18. Open a new case		
🕞 🛛 🖶 🔊 🖂 📵 🕫	Lucitled Untitled	- Aspen HYSYS V8.8 - aspenONE	_	
I IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Untitled ustomize Resources	- Aspen HYSYS V8.8 - aspenONE	– Search aspenONE Exchange	□ ×
I Image: Second seco	Untitled Untitled Map Compon	- Aspen HYSYS V8.8 - aspenONE ents	Search aspenONE Exchange	□ X & @
I III IIII IIIII IIIIIIIIII File Home View Cut IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Figure Untitled Untitled ustomize Resources	- Aspen HYSYS V8.8 - aspenONE ents rties Petroleum Petroleum W Ramouro Duplicator	Search aspenONE Exchange	- X - 0 0 0
▶ ► ▶ ► ■ File Home View Cu ▲ Component Fluid Component Lists Fluid Clipboard Navig	Figure Untitled Untitled Untitled Wethods Assistant ♣ Reactions ♣ User Properties yate Components	 Aspen HYSYS V8.8 - aspenONE ents rties Petroleum Assays Refining Convert Convert Remove Duplicates Hypotheticals 	Search aspenONE Exchange	□ ×
File Home View Cu Cut Component Fluid Packages Cipboard Navig Properties <	Figure Untitled ustomize Resources Methods Assistant Beactions User Properties Juster Properties Component Lists × +	18. Open a new case - Aspen HYSYS V8.8 - aspenONE ents Petroleum Assays Refining Hypotheticals Hypotheticals Hypotheticals Hypotheticals	Search aspenONE Exchange	
File Home View Cu Cut Component Lists Paste Clipboard Properties All Items	Figure Untitled	 Aspen HYSYS V8.8 - aspenONE Aspen HYSYS V8.8 - aspenONE Petroleum Assays Refining Convert Refining Convert Hypotheticals Convert Remove Duplicates Hypotheticals 	Search aspenONE Exchange	- ×
File Home View Cu Home View Cu Copy- Component Fluid Paste Component Fluid Cipboard Navig Properties All Items Fluid Packages Fluid Packages	Figure Untitled utitled ustomize Resources Methods Assistant AB Reactions User Properties Just Propent Lists × + List Name	18. Open a new case - Aspen HYSYS V8.8 - aspenONE ents Petroleum Assays Refining Whypotheticals Manager Hypotheticals Hypotheticals Source	Search aspenONE Exchange	
File Home View Cut Home View Cut Component Fluid Paste Component Packages Clipboard Navig Properties All Items Fluid Packages Petroleum Assays	Figure Untitled Untitled ustomize Resources Methods Assistant B Reactions Update Properties Jupdate Properties Component Lists × + List Name	IS. Open a new case - Aspen HYSYS V8.8 - aspenONE ents Petroleum Assays Refining © Source	Search aspenONE Exchange	
File Home View Cu Image: Component Component Fluid Paste Component Fluid Clipboard Navig Properties All Items Fluid Packages Piluid Packages Petroleum Assays Reactions	Figure Untitled Untitled ustomize Resources Methods Assistant Beactions User Properties Jate Component Lists × + List Name	18. Open a new case - Aspen HYSYS V8.8 - aspenONE ents Petroleum Assays Refining Source	Search aspenONE Exchange	
File Home View Cut Component Fluid Packages Clipboard Component Fluid Properties C All Items Fluid Packages Piluid Packages Fluid Packages Petroleum Assays Reactions	Figure Untitled ustomize Resources Methods Assistant B Reactions User Properties Component Lists × + List Name	18. Open a new case - Aspen HYSYS V8.8 - aspenONE ents Petroleum Assays Refining C Source	Search aspenONE Exchange	es
File Home View Cut Component Lists Paste Cipboard Component Lists Fluid Packages Fluid Packages Fluid Packages Petroleum Assays Reactions	Figure Untitled Untitled ustomize Resources Methods Assistant B Reactions User Properties Jate Component Lists × + List Name	18. Open a new case - Aspen HYSYS V8.8 - aspenONE ents rties	Search aspenONE Exchange	
File Home View Cut Component Fluid Properties All Items Fluid Packages Piluid Packages Petroleum Assays Reactions	Figure Untitled ustomize Resources Methods Assistant Beactions Update Properties Component Lists × + List Name	IS. Open a new case - Aspen HYSYS V8.8 - aspenONE ents Petroleum Assays Refining Convert Yetroleum Source	Search aspenONE Exchange	
File Home View Cut Component Fluid Paste Component Clipboard Navig Properties Component Lists Fluid Fluid Packages # Fluid Packages # Petroleum Assays # Reactions #	Figure Untitled Untitled ustomize Resources Methods Assistant B Reactions User Properties Just Component Lists × + List Name Messages D and the function of the funct	Aspen HYSYS V8.8 - aspenONE ents Petroleum Assays Refining Convert Remove Duplicates Hypotheticals Source	Search aspenONE Exchange	
File Home View Cut Component Fluid Packages Clipboard Component Fluid Properties C All Items Image: Clipboard Fluid Packages Image: Clipboard Properties C All Items Image: Clipboard Fluid Packages Image: Clipboard Properties C Fluid Packages Image: Clipboard Fluid Packages <th>Figure Untitled ustomize Resources Methods Assistant Beactions Update Properties Component Lists × + List Name Messages Required Info : Fluid Packages Select Required Info : Components Empty of</th> <th>18. Open a new case - Aspen HYSYS V8.8 - aspenONE ents Petroleum Assays Refining C Source</th> <th>Search aspenONE Exchange</th> <th></th>	Figure Untitled ustomize Resources Methods Assistant Beactions Update Properties Component Lists × + List Name Messages Required Info : Fluid Packages Select Required Info : Components Empty of	18. Open a new case - Aspen HYSYS V8.8 - aspenONE ents Petroleum Assays Refining C Source	Search aspenONE Exchange	
File Home View Cut Component Fluid Properties Component Clipboard Navig Properties Cut Component Fluid Paste Fluid Properties Cut Properties Cut Properties Cut Properties Cut Properties Cut Properties Cut Simulation Safety Analysis Sefety Analysis Supervise	Figure Untitled ustomize Resources Methods Assistant Beactions User Properties ate Component Lists × + List Name Messages Required Info : Fluid Packages Select Required Info : Components Empty of Pactured Info : Management List	Aspen HYSYS V8.8 - aspenONE ents Petroleum Assays Refining Fill Source III III Property pa Component I	Search aspenONE Exchange	es • • • ×

Figure 19. Appeared window after opening a new case or project

Define Component list and Fluid Package: Specify the chemical substances that will take place in the reactor. Also you have to choose the



suitable fluid package in order to perform the different associated calculations.

月 🛛 🖶 🤊 📃 🗊 🕫		Untitled - As	pen HYSYS V	8.8 - aspenONE		- 🗆 ×
File Home View Cu	ustomize Resources				Search aspenONE	Exchange 🛛 🔎 🗠 🔞
λ Cut 🗐 Π	A Methods Assistant	Map Components	4	🧭 Hypotheticals Manager	📕 🖉 📦 🚥	-
Сору-	Reactions	Update Properties	4	3 Convert	14 👔 -	
Component Fluid	User Properties	~	Petroleum	Remove Duplicates		
Clipboard Navig	Jate	Components	Refining 📮	Hypotheticals	Oil Options PVT	Data
Properties <	Component List - 1	× +		·		
All Items 🔹						<u> </u>
Component Lists						
Component List - 1	Source Databank: HY	'SYS				Select: Pure Co
Fluid Packages						Search for
🔁 Basis-1	Component	Туре		Group		
🔯 Petroleum Assays	Amm	onia Pure Co	mponent			
Contractions		H2O Pure Co	mponent			Simulation Name
Component Maps		H2S Pure Co	mpopont		< Add	Me
😡 User Properties		1125 1 112 CO	mponent		() Idd	
Torrestor						E
Properties						Prc
□ [□] Simulation					Replace	i-B 🗸
	•					•
🔊 Safety Analysis	Massagas					<u>→</u> ¤ ×
	wiessages			Error: 0.001351	Stan Siza:	1 0000
69 Energy Analysis				Iter: 7 Eqm E	rror: 0.00003	9 Heat/Spec
				Iter: 8 Eqm E Error: 0.000110	rror: 0.00000	Heat/Spec
				Column Flowsheet St	ripper Converged	*
					100% 🤅	
	T .					
	F1g	ure 20. Add	ling the	component lis	t	
	F1g	ure 20. Add	ling the	component lis	t	
	F1g	ure 20. Add	ling the	component lis	t	- D Y
	F1g	Untitled - As	pen HYSYS V	component lis 3.8 - aspenONE	t	- 🗆 X
File Home View Cu	Istomize Resources	Untitled - As	pen HYSYS V	component lis	Search aspenONE I	− □ × Exchange 2 ≏ ©
I Image: Second seco	Istomize Resources	Untitled - As	pen HYSYS V&	Component lis	Search aspenONE L	− □ × Exchange 👂 ۿ @
File Home View CL K Cut Cut L Copy Component Fluid	Istomize Resources Methods Assistant Ag Reactions	Untitled - As Map Components Update Properties	pen HYSYS V8	Component lis	Search aspenONE E	– □ X Exchange 🔎 ۿ @
▶ ↓ ▶ ▶ ▶ ↓ File Home View CL ↓ Cut ↓ ↓ ↓ Component ↓ ↓ ↓ Lists Packages ↓	stomize Resources Methods Assistant	Untitled - As Map Components Update Properties	pen HYSYS V&	Component lis	Search aspenONE E	– – X Exchange 🔎 🌣 🔞
File Home View Cu Korpy- Component Fluid Clipboard Navig	Fig ustomize Resources Methods Assistant Ag Reactions User Properties ate Barie 1 +	Untitled - As Untitled - As Update Properties Components	Petroleum Assays Refining 5	Component lis	Search aspenONE I	– □ × Exchange 2 ⊗ @
File Home View Cu Home View Cu Copy- Component Fluid Paste Clipboard Navig Properties	Fig ustomize Resources Wethods Assistant Ag Reactions Wer Properties ate Basis-1 × +	Untitled - As Untitled - As Map Components Opdate Properties Components	Petroleum Assays Refining S	Component lis	t Search aspenONE I Search aspenDiated Search asp	– □ × Exchange 2 ⊗ 0 Data
File Home View Cut Home View Cut Component Fluid Paste Component Clipboard Navig Properties	Fig ustomize Resources Methods Assistant A _B Reactions Wer Properties ate Basis-1 × + Set Up Binary Coef	Untitled - As Untitled - As Undate Properties Components ffs StabTest Phase	Petroleum Assays Refining S	Component lis 3.8 - aspenONE Whypotheticals Manager Convert Remove Duplicates Hypotheticals Anothericals	t Search aspenONE I Search aspenDiated Search asp	– □ × Exchange 2 ⊗ 0 Data
File Home View Cut Home View Cut Component Fluid Paste Component Fluid Clipboard Navig Properties All Items	Jistomize Resources Methods Assistant Ag Reactions Wer Properties ate Basis-1 × + Set Up Binary Coel Package Type:	Untitled - As Untitled - As Undate Properties Components ffs StabTest Phase HYSYS	pen HYSYS V& Petroleum Assays Refining 5 Order Tabul	Component lis 3.8 - aspenONE Hypotheticals Manager Convert Remove Duplicates Hypotheticals ar Notes Componen	t Search aspenONE I	– □ × Exchange 2 ⊗ Ø Data
File Home View Cut Component Fluid Fluid Properties All Items Component Lists Component Lists	Jistomize Resources Methods Assistant Ag Reactions User Properties ate Basis-1 × + Set Up Binary Coel Package Type:	Untitled - As Untitled - As Update Properties Components ffs StabTest Phase HYSYS	pen HYSYS V& Petroleum Assays Refining 5 Order Tabul	Component lis 3.8 - aspenONE Hypotheticals Manager Convert Remove Duplicates Hypotheticals ar Notes Componen	t Search aspenONE I Search aspenONE I Del Options PVT	−
File Home View Cut Home View Cut Component Fluid Paste Component Packages Clipboard Navig Properties All Items Component Lists Component Lists Fluid Packages	Jistomize Resources Methods Assistant Ag Reactions Wer Properties ate Basis-1 × + Set Up Binary Coel Package Type: Property Package	Untitled - As Untitled - As Undate Properties Components Iffs StabTest Phase HYSYS Selection	pen HYSYS Va Petroleum Assays Refining 5 Order Tabul	Component lis 3.8 - aspenONE Hypotheticals Manager Convert Remove Duplicates Hypotheticals ar Notes Componen	t Search aspenONE I Search aspenONE I Del Options PVT	
File Home View Cut Home View Cut Component Fluid Properties All Items Component Lists Component List - 1 Filuid Packages Pasis - 1 Petroleum Assavs	Fig ustomize Resources Wethods Assistant A _B Reactions Wer Properties ate Basis-1 × + Set Up Binary Coel Package Type: Property Package	ure 20. Add Untitled - As Map Components Update Properties Components HYSYS Selection	Petroleum Assays Refining G Order Tabul	Component lis	t Search aspenONE I Search aspenONE I Del Control Control Control Oli Options PVT	
File Home View Cut Home View Cut Component Fluid Properties Component Lists Component List - 1 Fluid Packages Petroleum Assays Reactions	Fig ustomize Resources Methods Assistant A _B Reactions Wer Properties late Basis-1 × + Set Up Binary Coet Package Type: Property Package MBWR MBWR	ure 20. Add Untitled - As Map Components Update Properties Components HYSYS Selection	Petroleum Assays Refining G Order Tabul	Component lis	t Search aspenONE I Search aspenONE I Options PVT t List Selection	
File Home View Cut Home View Cut Component Fluid Properties Component Lists Component Lists Component Lists Properties Properties Properties Properties Properties Properties Properties Properties Component Lists Petroleum Assays Reactions Component Maps	Jistomize Resources Methods Assistant Sections Wer Properties Jate Basis-1 × + Set Up Binary Coel Package Type: Property Package MBWR NBS Steam NBS Steam	ure 20. Add Untitled - As Map Components Update Properties Components HYSYS Selection	Petroleum Assays Refining G Order Tabul	c for H2, He	t Search aspenONE I Search aspenONE I Options PVT t List Selection Property Package I Cost Modify Tc, Pc for H2,	
File Home View Cut Home View Cut Component Fluid Properties All Items Component Lists Component List - 1 Fluid Packages Petroleum Assays Reactions Component Maps Component Maps Component Maps User Properties	Jistomize Resources Methods Assistant AB Reactions Wer Properties Iate Basis-1 × + Set Up Binary Coel Package Type: Property Package MBWR NBS Steam NRTL OLI Electrolyte	Unitiled - As Unitiled - As Unitiled - As Update Properties Components Iffs StabTest Phase HYSYS Selection	Petroleum Assays Refining G Order Tabul Options Enthalpy Density Modify Tc, P Indexed Visy	c for H2, He	t Search aspenONE I Search aspenONE I Options PVT t List Selection Property Package I Cost Modify Tc, Pc for H2, HYSY S Visco	- C × Exchange 2 ⊗ 0 Data Data Component List - 1 [HYSYS EOS tald He sity
File Home View Cut Home View Cut Component Fluid Properties Cut Component Fluid Properties Cut Component Cut Properties Cut Component Cut Properties Cut Component Cut Properties Cut Component Cut Component Cut Component Cut Properties Cut Component Cut Component Cut Component Cut Component Cut Component Cut Component Cut Cut Cut Component Cut Cut Cut	Fig ustomize Resources Methods Assistant AB Reactions Wer Properties Iate Basis-1 × + Set Up Binary Coel Package Type: Property Package MBWR NBS Steam NRTL OLLElectrolyte Peng-Robinson	ure 20. Add Untitled - As Map Components Update Properties Components HYSYS Selection	Petroleum Assays Refining G Order Tabul Options Enthalpy Density Modify Tc, P Indexed Viss Peng-Robin	c for H2, He cosity con Quitons	t Search aspenONE I Search aspenONE I Options PVT t List Selection Property Package I Cost Modify Tc, Pc for H2, HYSYS Visco HYSY Svisco	- C × Exchange 2 ⊗ 0 Data Data COMPONENT List - 1 [HYSYS For Parameters =
File Home View Cut Component Fluid Packages Clipboard Navig Properties All Items Component Lists Component Lists Component Lists Component Lists Properties Reactions Component Maps User Properties	Jistomize Resources Methods Assistant AB Reactions Wer Properties Ide Basis-1 × + Set Up Binary Coel Package Type: Property Package MBWR NBS Steam NRTL OL_Electrolyte Peng-Robinson PR-Twu	Untitled - As Untitled - As Untitled - As Update Properties Components Iffs StabTest Phase HYSYS Selection	Petroleum Assays Refining 's Order Tabul Options Enthalpy Density Modify Tc, P Indexed Viss Peng-Robin: EOS Solutio	c for H2, He cosity con Options con Options con Options cosity con Options con Options cosity con Options cosity con Options con Options cosity con Options con Options cosity con Options cosity con Options cosity con Options cosity con Options cosity con Options cosity con Options cosity con Options cosity co	t Search aspenONE I Control Control	- C × Exchange 2 ⊗ 0 Data Omponent List - 1 [HYSYS EOS tald He sity SYS hod
File Home View Cut Component Fluid Packages Clipboard Navig Properties All Items Component Lists Component Lists Component Lists Component Lists Properties Reactions Component Maps User Properties	Fig Jstomize Resources Methods Assistant AB Reactions Wer Properties Justom Properties International State State Property Package MBWR NBS Steam NRTL OLL Electrolyte Peng-Robinson PR-Twu PRSV	Untitled - As Untitled - As Untitled - As Update Properties Components HYSYS Selection	Petroleum Assays Refining G Order Tabul Options Enthalpy Density Modify Tc, P Indexed Viss Peng-Robin EOS Solutio Phase Ident	c for H2, He cosity son Options n Methods fication	t Search aspenONE I Control options PVT t List Selection Property Package I Cost Modify Tc, Pc for H2, HYSY Svisco HY bic EOS Analytical Metl Defi	- × Exchange 2 ∞ Ombonent List - 1 [HYSYS ■ EOS Parameters tald He sity SYS hod ault
File Home View Cut Component Fluid Packages Clipboard Component Lists Navig Properties All Items Component Lists Component Lists Component Lists Properties Weakages Petroleum Assays Weakages Weakages Petroleum Assays Weakages View Properties Simulation	Fig ustomize Resources Methods Assistant AB Reactions User Properties iate Basis-1 × + Set Up Binary Coe Package Type: Property Package MBWR NBS Steam NRTL OL Lefectrolyte Peng-Robinson PR-Twu PRSV Sour PR	ure 20. Add Untitled - As Map Components Update Properties Components HYSYS Selection	Petroleum Assays Refining 5 Order Tabul Options Enthalpy Density Modify Tc, P Indexed Viss Peng-Robin EOS Solutio Phase Ident	component lis	t Search aspenONE I Control options PVT t List Selection Property Package I Cost Modify Tc, Pc for H2, HYSY Svisco HY bic EOS Analytical Meth Defi	- × Exchange 2 2 Data - - omponent List - 1 [HYSYS = EOS Parameters = tald He = sity SYS + hod ault -
File Home View CL Component Fluid Packages Clipboard Component Lists Navig Properties All Items Fluid Packages Component Lists Component Lists Fluid Packages Fluid Packages Petroleum Assays Reactions User Properties Simulation Safety Analysis	Fig ustomize Resources Methods Assistant Ag Reactions User Properties iate Basis-1 × + Set Up Binary Coe Package Type: Property Package MBWR NBS Steam NRTL OLL Electrolyte Peng-Robinson PR-Twu PRSV Sour PR	ure 20. Add Untitled - As Map Components Update Properties Components HYSYS Selection	Petroleum Assays Refining 5 Order Tabul Options Enthalpy Density Modify Tc, P Indexed Viss Peng-Robin: EOS Solutio Phase Ident	component lis	t Search aspenONE I Control options PVT t List Selection Property Package I Cost Modify Tc, Pc for H2, HYSY Svisco HYSY Svisco HYSY Svisco HY	- X Exchange A G Data Data
File Home View Cut Component Fluid Packages Clipboard Component Lists Navig Properties All Items Component Lists Component Lists Component Lists Properties Weakages Petroleum Assays Reactions User Properties Properties Simulation Safety Analysis	Fig ustomize Resources Methods Assistant Ag Reactions User Properties iate Basis-1 × + Set Up Binary Coe Package Type: Property Package MBWR NBS Steam NRTL OLL Electrolyte Peng-Robinson PR-Twu PRSV Sour PR Messages	ure 20. Add Untitled - As Map Components Update Properties Components HYSYS Selection	Petroleum Assays Refining 5 Order Tabul Options Enthalpy Density Modify Tc, P Indexed Viss Peng-Robin: EOS Solutio Phase Ident	c for H2, He cosity son Options n Methods fication	t Search aspenONE I Control options PVT t List Selection Property Package I Cost Modify Tc, Pc for H2, HYSYS Visco HY bic EOS Analytical Methods Definition	- X Exchange A G Data Data Component List - 1 [HYSYS EQS Parameters EQS tald He sity SYS hod ault
File Home View Cut Component Fluid Packages Clipboard Component Lists Packages Clipboard Component Lists Component Lists Component Lists Component Lists Component Lists Component Lists Component Lists Component Lists Component Lists Component Lists Component Lists Properties Component Maps Component Maps Component Maps User Properties Component Maps Simulation Safety Analysis Safety Analysis	Fig ustomize Resources Methods Assistant Ag Reactions User Properties iate Basis-1 × + Set Up Binary Coe Package Type: Property Package MBWR NBS Steam NRTL OLI Electrolyte Peng-Robinson PR-Twu PRSV Sour PR Messages	Urte 20. Add Untitled - As Untitled - As Update Properties Components ffs StabTest Phase HYSYS Selection	Petroleum Assays Refining 5 Order Tabul Options Enthalpy Density Modify Tc, P Indexed Viss Peng-Robin: EOS Solutio Phase Identi	component lis	t Search aspenONE I Control options PVT t List Selection Property Package I Cost Modify Tc, Pc for H2, HYSY Svisco HYSY Svisco HYSY Svisco HY sice EOS Analytical Meth Defi	Exchange
File Home View Cut Component Fluid Packages Clipboard Component Lists Navig Properties All Items Properties Component Lists Component Lists Properties Wiew Cut Properties Properties Seactions Component Maps Were Properties Simulation Safety Analysis Simulation Safety Analysis Start Analysis Start Analysis <	Fig ustomize Resources Methods Assistant Ag Reactions User Properties iate Basis-1 × + Set Up Binary Coe Package Type: Property Package MBWR NBS Steam NRTL OLL Electrolyte Peng-Robinson PR-Twu PRSV Sour PR Messages	ure 20. Add Untitled - As Untitled - As Update Properties Components Ffs StabTest Phase HYSYS Selection	Petroleum Assays Refining 5 Order Tabul Options Enthalpy Density Modify Tc, P Indexed Viss Peng-Robin: EOS Solutio Phase Identi	component lis	t Search aspenONE I Control options PVT t List Selection Property Package I Cost Modify Tc, Pc for H2, HYSY Svisco HY sic EOS Analytical Metl Defi Tror: Step Size: 1 0.00003 Step Size: 1 0.00003	Exchange
File Home View Cut Component Fuid Packages Cipboard Component Lists Navig Properties All Items Component Lists © Component Lists Component Lists Fluid Packages Petroleum Assays Reactions User Properties Simulation Safety Analysis Sinulation Safety Analysis	Fig ustomize Resources Methods Assistant Ag Reactions User Properties iate Basis-1 × + Set Up Binary Coe Package Type: Property Package MBWR NBS Steam NBS Steam NBTL OU_Electrolyte Peng-Robinson PR-Twu PRSV Sour PR Messages	ure 20. Add Untitled - As Untitled - As Update Properties Components ffs StabTest Phase HYSYS Selection	Petroleum Assays Refining 5 Order Tabul Options Enthalpy Density Modify Tc, F Indexed Viss Peng-Robin: EOS Solutio Phase Identi	component lis	t Search aspenONE I Control options PVT t List Selection Property Package I Cost Modify Tc, Pc for H2, HYSYS Visco HY Step Size: 1 0.00003 Step Size: 1 0.00003 Step Size: 1 0.00003	- × Exchange • • •

Figure 21. Choose the fluid package



Go to simulation environment: by clicking on the simulation icon on the down left.

🕒 i 🔚 🤊 🕫 🖃 🤇	🗊 Ŧ	Untitled -	Aspen HY	SYS V8.8 - aspen	ONE				-	-		\times
File Home E	conomics	Dynamics	View	Customize	Resources	Flowsheet/Modify	Format	Search aspenON	IE Exchange		₽ ♡	0
Simulation	<	Economics	;			Energy		된 Palette	-		×	~
All Items	-	Capital	Cost	Utility Cost		Available I	Energy Savi					
📷 Workbook	*		-				~ ~ ~					
📷 UnitOps		USL)	USD/Year	off	MW	% of A					
ktreams		Flowsheet (ase (Mai	n) - Solver Activ	e× 🕂			Refining				-
Stream Analysis	=						_	Dynamics	Upstream			
Requipment Design								Common	Columns	Cust	om	
Model Analysis											~~	
Data lables								L L'		2	←~~~→	
Case Studies	-											
17												
Properties									V. E.	\$⊳,-	× 🛱	
										<u> </u>		\sim
Simulation		<						* 🛃 🖓 🖓 🕌	Cn(A)	\$3	• ,	
Safety Analysis		Messages								- -	<u>+</u> 11+	1 × 1
		messages					_				4	
🍐 Energy Analysis								• • • 🗍 '	77 🔂	æ.	,	
	•								⊻_ рн-∕		\checkmark	
												1
Solver (Main) - Ready								76% Θ			•	

Figure 22. clicking on Simulation Icon

Add Stripper: from the Palette, add a stripper by selecting the distillation column.





된 🔒 🤊 🤯 🖃 🗉 🖣	Untitled	- Aspen HYSYS V8.8	- aspenONE						- 🗆		×
File Home Economics	Dynamics	View Custor	mize Re	sources	Flowsheet/Modify	Format	Search aspen	ONE Excha	nge 💈	⊘ ⊘	0
Simulation <	Capital:	_USD Utilities:	USD/Year		Energy Savings:	MW (_%)	Exc	changers - Unkr	no 🕨	$^{\circ}$
All Items *	Flowsheet	Case (Main) - Solve	er Active $ imes$	+	<u></u>						
 Workbook Workbook UnitOps Streams Stream Analysis Equipment Design Model Analysis Data Tables Strip Charts Case Studies Data Fits 											<
Properties Simulation Safety Analysis					T-100						~
Energy Analysis	Messages									>	
Solver (Main) - Ready	-						98%	Θ	-0	.	

Figure 24. Add the stripper to the PFD

> Set Operating Conditions: Define the operating conditions of the stripper,



number of stages, fluxes, temperature, pressure, and flow rates. These conditions significantly impact the process.



Figure 25. Setting the streams in the stripper



Figure 26. Setting the parameters of the stripper 1





Figure 28. Setting the parameters of the stripper 3



된 Dis	tillation Column Input Expert				- 🗆	\times
		Ref	lux Ratio	Vapour Rate Flow Basis	Molar	
	< Prev Done	Side Ops >	Speci	ifications (page 5 of 5)	Cancel	
]	Figure 29. Comple	ete stripper	settings		
Column: Stripp	per Column / COL2 Fluid Pkg: Basis-1 /	Peng-Robinson	stions Dynamics		_	
Worksheet	Side ops Mating Worksheet	Water cour	cuons Dynamics	D		
Conditions	Ammonia	0.1695	<empty></empty>	K <empty></empty>		
Properties	H2O	0.8220	<empty></empty>	<empty></empty>		
Compositions	H2S	0.0085	<empty></empty>	commuter.		
PF Specs				<empty></empty>		
				<empty></empty>		

Figure 30. entering the different conditions 1



🛃 Column: Strip	per Column / COL2 Fluid Pkg: Basis-1 / F	Peng-Robinson				- 🗆	×
Design Param	eters Side Ops Rating Worksheet	Performance Flowsheet	t Reactions Dynamic	CS			
Worksheet Conditions	Name	Water_sour @COL2	C @COL2	R @COL2			
Properties	Vapour	0.1736	1.0000	<empty></empty>			
PF Specs	Temperature [C]	103.0	<empty></empty>	<empty></empty>			
	Pressure [bar]	2.800	2.000	2.100			
	Molar Flow [kgmole/h]	200.2	<empty></empty>	<empty></empty>			
	Mass Flow [kg/s]	1.000	<empty></empty>	<empty></empty>			
	Std Ideal Liq Vol Flow [USGPM]	17.53	<empty></empty>	<empty></empty>			
	Molar Enthalpy [Btu/lbmole]	-1.019e+005	<empty></empty>	<empty></empty>			
	Molar Entropy [Btu/lbmole-F]	22.22	<empty></empty>	<empty></empty>			
	Heat Flow [kW]	-1.318e+004	<empty></empty>	<empty></empty>			
Delete	Column Environment	Run Re	set	Unconverged	Update Out	tlets 📃 Igno	ored

Figure 31. Entering the different conditions 2

Design Paramete	rs Side Ops Rating Worl	ssheet Performance Flowshe	eet Reactions Dyn	namics					(
Design Connections Monitor Specs Specs Summary Subcooling Notes	Optional Checks Input Summary Iter Step Equili	View Initial Estimates orium Heat / Spec	 Profile Temp Press Flows 	Tempera	Temperature	vs. Tray		from Top	
	Specifications								
		Specified Value	Current Value	Wt. Error	Active	Estimate Cu	irrent		
	Reflux Ratio	<empty></empty>	<empty></empty>	<empty></empty>	R	N.	$\mathbf{\nabla}$		
	Ovhd Vap Rate	<empty></empty>	<empty></empty>	<empty></empty>	Ā	N	N		
	Reflux Rate	<empty></empty>	<empty></empty>	<empty></empty>	Г	N	Г		
	Btms Prod Rate	<empty></empty>	<empty></empty>	<empty></empty>	Г	N N	Г		

Figure 32. Configuration of the rest parameters



Design Paramete	rs Side Ops Rating Worl	csheet Performance Flowshe	eet Reactions Dyr	amics	
Design	Optional Checks		Profile		
Connections Monitor Specs Specs Summary Subcooling Notes	Input Summary Iter Step Equili	View Initial Estimates prium Heat / Spec	 Temp Press Flows 	Temperature vs. Tray Position from	
	Specifications	Specified Value	Current Value	Wt. Error Acting Estimate Current	
	Reflux Ratio	<empty></empty>	<empty></empty>	<empty< td=""><td></td></empty<>	
	Ovhd Vap Rate	<empty></empty>	<empty></empty>	<empty></empty>	
	Poflux Pata	<empty></empty>	<empty></empty>	<empty< td=""><td></td></empty<>	
	Renux Rate				
	Btms Prod Rate	<empty></empty>	<empty></empty>	<empty></empty>	

Figure 33. Configuration of the rest parameters

esign Parameter	s Side Ops Rating Wor	ksheet Performance Flowshee	et Reactions Dyna	Ndd Specs - S	\times	
Design	Optional Checks		Profile	Column Specification Types		
onnections	Input Summary	View Initial Estimates		Column Cold Droportion Spag		on from Top
lonitor				Column Component Flow		
ecs	Itor Stop Fauili	brium Heat / Spoc		Column Component Fraction		
ecs Summary	iter Step Equili	bituiti Tieacy Spec	Press	Column Component Ratio		
bcooling			© Flows (Column Component Recovery		
otes			7	Column Cut Point		
				Column Draw Rate	=	
			0	Column DT (Heater/Cooler) Spec		5 8
				Column Dt Spec		
	Specifications			Column Duty		
		Specified Value	Current Value	Column Ered Ratio		
	Reflux Ratio	<empty></empty>	<empty></empty>	Column Gan Cut Point		
	Ovhd Vap Rate	<empty></empty>	<empty></empty>	Column Liquid Flow		
	Reflux Rate	<empty></empty>	<empty></empty>	Column Physical Properties Spec		
	Btms Prod Rate	<empty></empty>	<empty></empty>	Column Pump Around		
				Column Reboil Ratio Spec		
				Column Recovery		
		\leq		Column Reflux Feed Ratio Spec		
				Column Reflux Fraction Spec	-	
	View	Add Spec Group	Active Up			
				Add Spec(s)		

Figure 34. Adding of the mentioned new parameters in the example



Parameters	Summary	Spec Type		
Name			Comp Fracti	on
Stage			Reboi	ler
Flow Basis			Mole Fracti	on
Phase			Liqu	uid
Spec Value			5.000e-0	05
		Stream	Stage	

Figure 35. Entering the value required of the Ammonia in the water as a specification



arameters	Summary	Spec Type		
Name			Comp Recove	ry
Draw			R @CO	L2
Spec Value			0.999	99
		<< Co	omponent >>	

Figure 36. Entering the value required of the water recovery in the water as a specification

esign Paramet	ers Side C	ops Rating	g worksheet F	erformance Fi			2)					
Design	Option	al Checks –				Profile -						
onnections	Inj	out Summa	ry Vie	w Initial Estimate	5		Tempe	erature	vs. Tra	iy Posi	tion fro	m Top
Ionitor							140.0	Temperatu	re.	-		· ·
pecs	lter	Char	E au ditia di una	Uset / Cores		Iemp	100.0	remperator				P
becs Summary	Iter	Step	Equilibrium	Heat / Spec		Press	· · · · · ·					
ubcooling	116	1.0000	0.000018	0.000	24	Flow:	s 60.00					
otes	117	1.0000	0.000017	0.000	07		20.00					
	118	1.0000	0.000015	0.0004	90							
	440	1 0000	0.000045	0.000	75		-20.00					1 1
	119 Specifie	1.0000	0.000015	0.0004 Decified Value	75	• Current Value	-20.00 -	2 Active	Estimate	4 Current	6	8
	Specific	1.0000	0.000015	0.0004 Decified Value	75	• Current Value	-20.00 -	2 Active	Estimate	4 Current	6	8
	Specific Reflux	1.0000 cations	0.000015	0.0004 Decified Value	75 75 (ty>	Current Value	-20.00	2 Active	Estimate	4 Current	6	8
	Specific Reflux Ovhd	1.0000 cations cations catio Vap Rate	0.000015	0.0004 Decified Value	75 75 ty>	Current Value	-20.00 0 0 Wt. Error 43 <empty 63 <empty< td=""><td>2 Active y></td><td>Estimate</td><td>4 Current</td><td>6</td><td>8</td></empty<></empty 	2 Active y>	Estimate	4 Current	6	8
	Specific Reflux Ovhd Reflux	1.0000 t coord cations (Ratio Vap Rate (Rate	0.000015	0.0004 Decified Value <emp <emp< td=""><td>(ty> ty> ty></td><td>Current Value 1.5 35. 54.</td><td>-20.00 0 Wt. Error 43 <empty 63 <empty 97 <empty< td=""><td>2 Active y></td><td>Estimate</td><td>4 Current</td><td>6</td><td>8</td></empty<></empty </empty </td></emp<></emp 	(ty> ty> ty>	Current Value 1.5 35. 54.	-20.00 0 Wt. Error 43 <empty 63 <empty 97 <empty< td=""><td>2 Active y></td><td>Estimate</td><td>4 Current</td><td>6</td><td>8</td></empty<></empty </empty 	2 Active y>	Estimate	4 Current	6	8
	Specific Specific Reflux Ovhd Reflux Btms	1.0000 cations cations cations vap Rate c Rate Prod Rate	0.000015	0.000 Decified Value	((ty> ty> ty> ty>	Current Value 1.5 35. 54. 164	-20.00 0 Wt. Error 43 <empty 63 <empty 97 <empty 4.5 <empty< td=""><td>2 Active y> y></td><td>Estimate</td><td>4 Current</td><td>6</td><td>8</td></empty<></empty </empty </empty 	2 Active y>	Estimate	4 Current	6	8
	Specific Reflux Ovhd Reflux Btms Comp	1.0000 cations cations cation vap Rate cate Prod Rate p Fraction	0.000015	0.0004 Decified Value <emp <emp <.emp 5.000e</emp </emp 	ty> ty> ty> ty> 005	Current Value 1.5 35. 54. 16- 4.993e-0	-20.00 0 Wt. Error 43 <empty 63 <empty 97 <empty 4.5 <empty 005 -0.000</empty </empty </empty </empty 	2 Active /> /> /> /> /> //> // // // // // // //	Estimate	4 Current	6	8

Figure 37. Run the simulation



Weter sour C # Orderstein 0.1685 0.9519 Orgenstein 0.0005 0.0000 Topparties 0.0005 0.0076 Orgenstein 0.0005 0.0076 Topparties Topparties Topparties Topparties Topparties Topparti	-	eters Side Op	s Rating	Worksheet	Performance	Flowsheet	Reactions	Dynamics							
Antenona Antenona Antenona Antenona Antenona Anteno	Worksheet								1						
Properties Sterry Analysis Sterry Analysis Properties Sterry Analysis Sterry	Conditions	Ammonio			vvau	0 1 COE	L C	0.0510	K	0.0000					
Compatibility PF Spession Petere Column Environment. Run Reset Consumption Figure 38. The obtained results I Figure 38. The obtained results I Figure 38. The obtained results I Prospective Control Dynamics View Custorine Resurces Prosteet/Modify Formal Search appenDNE Prospect/Modify Formal Search appenDNE Prospective (Figure 2000) Prospective Control Dynamics View Custorine Resurces Prosteet/Modify Formal Search appenDNE Prospective (Figure 2000) Prospective Control Dynamics View Custorine Resurces Prospect/Modify Formal Search appenDNE Prospective (Figure 2000) Prospective Control Dynamics View Custorine Resurces Prospect/Modify Formal Search appenDNE Prospective (Figure 2000) Prospective Control Dynamics View Custorine Resurces Prospect/Modify Formal Search appenDNE Prospective (Figure 2000) Prospective Control Dynamics View Custorine Resurces Prospect/Modify Formal Search appenDNE Prospective (Figure 2000) Prospective Control Dynamics View Custorine Resurces Prospective (Figure 2000) Prospective Custor Main(Figure 2000) Prospective Custor Main(Figure 2000) Prospective Custor (Figure 2000) Pr	Properties	H2O				0.8220		0.0005		1 0000					
PF Spess Delete Column Environment. Run Rest Conversed Vijdate Outlets Ignore Figure 38. The obtained results 1 Figure 38. The obtained results 1 Figure 38. The obtained results 1 Provener Figure 38. The obtained results 1 Provener Converse Provener	Compositions	H2S				0.0085		0.0476		0.0000	/				
Delete Column Environment Run Reset Coverged Update Outles Ignore Figure 38. The obtained results 1 Figure 4. The obtained result	PF Specs														
Detet Column Environment Run Reset Converged Update Outlets gnore Figure 38. The obtained results 1 Image: Colonic Dynamics View Cutomize Resources Flowsheet/Modify Format Search aspenONE Exchanges Image: Colonic Dynamics View Cutomize Resources Flowsheet/Modify Format Search aspenONE Exchanges Image: Colonic Dynamics View Cutomize Resources Flowsheet/Modify Format Search aspenONE Exchanges Image: Colonic Dynamics View Cutomize Resources Flowsheet/Modify Format Search aspenONE Exchanges Image: Colonic Dynamics View Cutomize Resources Flowsheet/Modify Format Search aspenONE Exchanges Image: Colonic Dynamics View Cutomize Resources Flowsheet/Modify Format Search aspenONE Exchanges Image: Colonic Dynamics View Cutomize Resources Flowsheet/Colonic Dynamics View Active Image: Colonic Dynamics View Cutomize Resources Flowsheet/Colonic Dynamics View Cutomize Resources Flowsheet/Column Striptor Striptor Resources Flowsheet/Cutomize Resources Flowsheet/Column Striptor Striptor Resources Flowsheet/Cutomize Resources Flowsheet/Column Striptor Resources Flowsheet/Cutomize Resources Flowsheet/Column Striptor Striptor <td></td>															
<pre>view continue of the continue view cont</pre>	Delete	Colu	mn Enviror	ument	Run Figure	e 38. Tl	et he obta	uined re	Converge esults 1	d		☑ Update Out	ilets	Ignor	red
Il terns Flowsheet Case (Main) - Solver Active × + Flowsheet Case (Ma		Econom	cs Dv	namics V	iow Custo	mize Re	sources	-lowsheet	lodify Fo	ormat Se	parch asne	nONE Exchange	_		×
 Workbook UnitOps Streams Streams Streams Equipment Design Model Analysis Data Tables Strip Charts Case Studies Data Fits Properties Simulation Safety Analysis Energy Analysis	imulation	e Econom	cs Dyr	namics V	view Custo	omize Re	sources	Flowsheet Flowsheet/M	lodify Fo	ormat Se	earch aspe	enONE Exchange	e naers	- Unkno	× • (
 UnitOps Streams Stream Analysis Equipment Design Model Analysis Data Tables Strip Charts Case Studies Data Fits Properties Simulation Simulation Stafety Analysis Energy Analysis	imulation	ne Economi	cs Dyr Cap	namics V ital:USE	/iew Custo D Utilities:	omize Re _USD/Year	sources	Flowsheet Flowsheet/M Energy Sav	lodify Fo vings:N	ormat Se	earch aspe	enONE Exchange	ngers	- Unkno	>
 Streams Stream Analysis Equipment Design Model Analysis Data Tables Strip Charts Case Studies Data Fits Properties Simulation Simulation Safety Analysis Energy Analysis	imulation II Items	e Econom	cs Dyr Cap	namics V ital:USE wsheet Case	/iew Custo D Utilities: E (Main) - Solv	omize Re _USD/Year /er Active ×	sources	Flowsheet/M Flowsheet/M Energy Sav	lodify Fc vings:N	ormat Se /IW (earch aspe %)	Exchange	ngers ·	- Unkno	>
 Stream Analysis Equipment Design Model Analysis Data Tables Strip Charts C c g cond Water_sour Water_sour Q cond Q c	imulation II Items III Workbook	e Econom	cs Dyr Cap	namics V ital:USE	riew Custo) Utilities: : (Main) - Solv	omize Re _USD/Year /er Active ×	sources	Flowsheet/M Energy Sav	lodify Fc vings: N	ormat Se	earch aspe %)	enONE Exchange	ngers -	- Unkno	>
Equipment Design Model Analysis Data Tables Strip Charts Case Studies Data Fits Properties Simulation Safety Analysis Energy Analysis	imulation Il Items Workbook	ne Economi	Cap	namics V ital:USE	fiew Custo Utilities:	_USD/Year	sources	Flowsheet Flowsheet/M Energy Sav	lodify Fc vings:N	ormat Se /W (earch aspe	enONE Exchange	ngers -	- Unkno	>
 Model Analysis Data Tables Strip Charts Case Studies Data Fits Properties Simulation Safety Analysis Energy Analysis 	imulation II Items Workbook UnitOps Streams	ae Economi	Cap	namics V ital:USE	fiew Custo Utilities: (Main) - Solv	omize Re _USD/Year	sources	lowsheet Flowsheet/M Energy Sav	lodify Fa	ormat Se /W (earch aspe	EnONE Exchange Exchan	ngers -	- Unkno	~
 Data fables Case Studies Data Fits Properties Simulation Safety Analysis Energy Analysis 	inulation II Items Workbook UnitOps Streams Stream Ana Equipment	e Economi c alysis t Design	Cap	namics V ital:USE	'iew Custo) Utilities: : (Main) - Solv	mize Re _USD/Year	sources	Flowsheet/M Energy Sav	lodify Fc	ormat See	earch aspe	Exchange Exchange	ngers :	- Unkno	~
Case Studies Case Studies Data Fits Properties Simulation Safety Analysis Energy Analysis	inulation II Items Workbook Workbook Workbook Streams Stream Ana Equipment Model Ana Data Tabloo	e Economi alysis t Design alysis	Cap	namics V ital:USE	'iew Custo) Utilities: : (Main) - Solv	mize Re USD/Year	sources	Flowsheet/M Energy Sav	lodify Fc	ormat See	earch aspe	Exchange Exchange C	ngers -	- Unkno	
Data Fits Properties Simulation Safety Analysis Energy Analysis	inulation II Items Workbook Workbook Workbook Streams Stream Ana Equipment Model Ana Data Tables Strin Charts	e Economi alysis t Design alysis is	cs Dyr Cap	namics V ital:USE	Yiew Custo Utilities:	mize Re _USD/Year	sources	Flowsheet/M Energy Sav	lodify Fc	ormat Se	earch aspe	C Q_CONC	ngers d	- Unkno	
Properties Simulation Safety Analysis Energy Analysis	inulation Il Items Workbook JuitOps Streams Stream Ana Equipment Model Ana Data Tables Strip Charts Case Studie	e Economi alysis t Design alysis s s s s	cs Dyr Cap File	namics V ital:USE	Yiew Custo Utilities:	wize Re _USD/Year rer Active ×	sources	Iowsheet Flowsheet/M Energy Sav	lodify Fc	ormat Se	earch aspe	C C Q_CONC	ngers :	- Unknc	~
Properties Simulation Safety Analysis Energy Analysis	imulation II Items Vorkbook Vorkbook Vorkbook Vorkbook Streams Stream Ana Stream Ana Stream Ana Stream Ana Stream Ana Strip Charts Strip Charts Strip Charts Strip Charts Strip Charts	e Econom alysis t Design alysis s s is	cs Dyr Cap File	namics V ital:USE wsheet Case	Yiew Custo Utilities:	Vate	sources	Flowsheet/M Energy Sav	lodify Fc	ormat Se	earch aspe	C C Q_CONC	ngers ·	- Unkno	~
Properties Simulation Safety Analysis Energy Analysis	inulation II Items Workbook Workbook Workbook Workbook Streams Stream And Stream An	e Econom alysis t Design alysis s s s s	cs Dyr Cap Flo	namics V ital:USE	Yiew Custo Utilities:	USD/Year rer Active ×	sources	Flowsheet/M Energy Sav	lodify Fc	ormat Se	earch aspee	C C Q_CONC	ngers d	- Unkno	~
Properties Simulation Safety Analysis Energy Analysis	inulation II Items Workbook Workbook WitOps Streams Stream Ana Stream Ana Stream Ana Stream Ana Strip Charts Strip Charts Case Studie Data Fits	e Econom alysis t Design alysis s s s s s	cs Dyr	namics V ital:USE wsheet Case	Yiew Custo Utilities:	USD/Year ver Active ×	sources	Flowsheet/M Energy Sav	lodify Fc	ormat See	earch aspee	C Q_CONC	ngers d	- Unkno	
Safety Analysis	inulation II Items Workbook Workbook Workbook Workbook Workbook Streams Stream And Stream And Stream And Model Ana Data Tables Strip Charts Case Studie Data Fits	e Econom alysis t Design alysis s s s s s s	cs Dyr	namics V ital:USE wsheet Case	Yiew Custo Utilities:	USD/Year ver Active ×	sources	Flowsheet/M Energy Sav	lodify Fc	Armat See	earch aspee	C C Q_CONC	d	- Unkno	
Safety Analysis	inulation II Items Workbook Workbook Workbook Workbook Workbook Streams Stream Ana Equipment Model Ana Data Tables Strip Charts Case Studie Data Fits Properties	e Econom alysis t Design alysis s s s s s s	cs Dyr	namics V ital:USE wsheet Case	iem Custo Utilities:	USD/Year ver Active ×	sources	Flowsheet/M Energy Sav	lodify Fc	Armat See	earch aspee	C Q_CONC	d d	- Unkno	
Column	inulation il Items Workbook UnitOps Streams Stream Ana Equipment Model Ana Data Tables Strip Charts Case Studie Data Fits Properties	e Econom alysis t Design alysis s s s s s es	cs Dyr	namics V ital:USE wsheet Case	iem Custo Utilities:	USD/Year ver Active ×	sources	Flowsheet/M Energy Sav	lodify Fc	Armat See	earch aspec	C Q_CONC	ngers d	- Unkno	
Energy Analysis	Il Items II Items II Items II Items II Items III Items III Items III Items III Items IIII Items IIII Items IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	e Econom alysis t Design alysis s s s s s s	cs Dyr	namics V ital:USE wsheet Case	iem Custo Utilities:	USD/Year ver Active ×	sources	Flowsheet/M Energy Sav	iodify Fc vings:N	ernat See	earch aspee	C Q_CONC Q_Re	d d	- Unkno	
	mulation II Items Workbook UnitOps Streams Streams Model Ana Data Tables Strip Charts Case Studie Data Fits Properties Simulation Safety Anal	e Econom alysis t Design alysis s s s s s es	cs Dyr	namics V ital:USE wsheet Case	ieurrisis vo.	ver Active ×	sources	Flowsheet/M Energy Sa	iodify Fc vings:N	er	earch aspe	Q_CONC	d	- Unkno	
Manager	mulation Il Items Workbook UnitOps Streams Streams Hold Ana Odd Ana Otata Tables Strip Charts Case Studie Data Fits Properties Simulation Safety Anal Energy Anal	e Econom alysis t Design alysis s s s s s s s s s s s s s s s s s s	cs Dyr	namics V ital:USE wsheet Case	iew Custo Utilities: (Main) - Solv	USD/Year ver Active ×	sources	Iowsheet Flowsheet/M Energy Sav	iodify Fc vings:N	er in	earch aspee	C Q_CONC Q_Re	d d	- Unkno	

Figure 39. The obtained results 2

These steps provide a general guideline for simulating the stripper column in Aspen HYSYS. However, the specific details and nuances can vary depending on



the type and the complexity of the process involved. It's essential to consult Aspen HYSYS documentation and resources for more in-depth guidance on using the software effectively.

III-3-2- Liquid/Liquid Extraction

In order to perform this simulation, an example has been taken into consideration, and then numerous steps will be followed in order to resolve it.

Example 1: Simulate the separation of an equimolar Acetone/Water mixture using 3-Methylhexane as the solvent in an Aspen HYSYS liquid-liquid extraction column.

Parameters:

- Feed: Equimolar Acetone/Water mixture at 25°C, 50 kgmole/h, and 1.2 bar.
- Solvent: 3-Methylhexane at 25°C, 200 kgmole/h, and 3 bar.
- Column: 10 stages, top stage pressure: 104 kPa, bottom stage pressure: 200 kPa.

In order to solve this example, and simulate this process, it is necessary to follow up the previous mentioned steps, starting by selecting the component list, then the fluid package going then to the simulation environment and select the extraction column from the palette.

However, the other steps in setting the different parameters of the extractor are similar to the steps employed to set up the different parameters of the stripper and also the absorber, in which the number of stages should be assumed, also the top and bottom pressures, the different conditions of the solvent and the mixture, the next pictures depicted the necessary steps in order to perform this process and also the obtained results at the end of the simulation.



🕒 🛛 🖶 🤊 🚍 🔍 🔻		Untitled - Aspen HYSYS	V8.8 - aspenONE		_		
File Home View Cu	ustomize Resources			Search asp	enONE Exchange		0
Properties <	Component List - 1 × +						-
All Items *						A	
🔺 🔯 Component Lists	Source Databank: HVSVS				Select:	Pure Co	
Component List - 1	Source Butabank, THSTS				Select	T ure co	
Fluid Packages	Component	Type	Group]	Search for:	3-mhex	
Basis-1	Component	туре	Group				
Petroleum Assays	Acetone	Pure Component					
Reactions	H2O	Pure Component			Simula	ation Name	
	3-Mhexane	Pure Component		< Add		3344-Mh	
						334-Mh	
						33M-4Eh	
				Replace		33-Mh	
						24M 2Eb.	
						34IVI-3LIII	
A Properties				Remove		34-Mh(
						3M-3Eh	
머 <mark>음</mark> Simulation						3M-4Eh	r
参 局。		m				-	
Safety Analysis	Messages						×
S Energy Analysis	Warning : Fluid Pkg Transition	Not Solved	Error: 1.	#QNAN0 Step	Size: 1.0000	/Choc	~
S Energy Analysis	Warning : Fluid Pkg Transition	Not Solved	Error: 1.	#QNANO Step	Size: 1.0000	/Spec	
*	Optional Info - light L@COL1	Unknown Composit	Error: 1. fluid packages	#QNANO Step in this case compati	Size: 1.0000There a ble with assay mana	re no gement.	•
				1	00% \ominus 📃	(+)	

Figure 40. Setting component list



Figure 39. Setting fluid package



된 । 🔚 🤊 🎨 🖃 🖲 = ।	Untitled - Aspen HYSYS V8.8 - aspenONE	Flowsheet		-	- 🗆 🔅	×
File Home Economics	Dynamics View Customize Resources	Flowsheet/Modify Format	Search aspen			0
Simulation <	Capital:USD Utilities:USD/Year 🛛 💽	Energy Savings:MW (_%) (••••••••••••••••••••••••••••••••••••••		\odot
All Items *	Flowsheet Case (Main) - Solver Active 🗙 🕂					•
 Workbook UnitOps Streams Stream Analysis Equipment Design Model Analysis Data Tables Strip Charts Case Studies Data Fits 				Upstream Custom Common	Refining Dynamics Columns	
Properties	<	_				•
Safety Analysis	Messages					×
Energy Analysis						
Solver (Main) - Ready			135%			



🛃 । 🔒 🤊 🍕 🖃 🗉 🖛	Untitled - Aspen HYSYS V8.8 - aspenONE	Flowsheet		$ \Box$ \times
File Home Economics	Dynamics View Customize Resources	Flowsheet/Modify Format	Search aspenONE Exch	nange 👂 🛛 🖉
Simulation <	Capital:USD Utilities:USD/Year 🛛 🜑	Energy Savings:MW (%) 💽 [Exchangers - Unkno 🕨 🔗
All Items *	Flowsheet Case (Main) - Solver Active × +			-
 Workbook UnitOps Streams Stream Analysis Equipment Design Model Analysis Data Tables Strip Charts Case Studies Data Fits 		L		^
Z Properties		T 400		
		1-100		
Figure 2 Safety Analysis				
Energy Analysis	<			>
Solver (Main) - Ready	וווכססטפס		135% Θ	

Figure 42. Putting it into the PFD



된 Liquid-Liquid Extract	tor Input Expert - T-100					_		\times
Column Name	T-100							
Top Stage Inlet					Ovhd I	Light Liqu	id	
	` `				Light	UL .		•
Optional Inlet Streams	>	2	>	Optional Side Draws	;			
Stream	nlet Stage	Numb of		Stream	Туре	Draw St	age	
<< Stream >>		n = 10		<< Stream >>				
		1						
Bottom Stage Inlet		n			Bottom	s Heavy L	iquid	
Solvent	•				Heav	v L		•
Stage Numbering —						/	->	
Top Down	🔘 Bottom Up							
	,							
< Prev	Nexts		Connections (p	age 1 of 3)			Cancel	

Figure 43. Setting the parameters of the extractor 1



Figure 44. Setting the parameters of the extractor 2



Diquid-Liquid Extractor Input Expert - T-100		-		\times
	Optional Top Stage Temperature Estimate		→	
<u>n-1</u> n	Optional Bottom Stage Temperature Estimate		->	
< Prev Next > Done	Optional Estimates (page 3 of 3)		Cancel	



sign Param	eters Rating N	Norksheet	Performance	Flowsheet	Dynamics				
Vorksheet				Mixtur	e	Solvent	Light_L	Heavy_L	
onditions	H2O				0.5000	0.0000	<empty></empty>	<empty></empty>	
operties	Acetone				0.5000	0.0000	<empty></empty>	<empty></empty>	
ompositions	3-Mhexane				0.0000	1.0000	<empty></empty>	<empty></empty>	

Figure 46. Setting the compositions



 \times

🕑 Column: T-100 / COL1 Fluid Pkg: Basis-1 / PRSV

WORKSHEEL	Name	Mixture @COL1	Solvent @COL1	Light_L @COL1	Heavy_L @COL1	
Conditions	Vapour	0.0000	0.0000	<empty></empty>	<empty></empty>	
Properties	Temperature [C]	25.0000	25.0000	0 <empty> 0 1.0400</empty>	<empty> 2.0000</empty>	
Compositions	Pressure [bar]	1.2000	3.0000			
PF Specs	Molar Flow [kgmole/h]	50.0000	200.0000	<empty></empty>	<empty></empty>	
	Mass Flow [kg/s]	0.5284	5.5669	<empty></empty>	<empty></empty>	
	Std Ideal Liq Vol Flow [USGPM]	10.0793	127.8437	<empty></empty>	<empty></empty>	
	Molar Enthalpy [Btu/lbmole]	-1.148e+005	-9.807e+004	<empty></empty>	<empty></empty>	
	Molar Entropy [Btu/lbmole-F]	10.79	28.08	<empty></empty>	<empty></empty>	
	Heat Flow [kW]	-3.7090e+03	-1.2673e+04	<empty></empty>	<empty></empty>	

Figure 47. Setting the different parameters and conditions

Design Param	neters Rating V	Norksheet	Performance	Flowsheet Dynami	cs				
Worksheet	Name			Mixture @COL1	Solvent @COL1	Light_L @COL1	Heavy_L @COL1		
Conditions	Vapour			0.0000	0.0000	0.0000	0.0000		
Properties	Temperature [C]		25.0000	25.0000	24.6740	24.9776			
Compositions	Pressure [bar]			1.2000	3.0000	1.0400	2.0000		
F Specs	Molar Flow [kgr	nole/h]		50.0000	200.0000	225.1265	24.8735		
	Mass Flow [kg/s	5]		0.5284	5.5669	5.9709	0.1245		
	Std Ideal Liq Vo	I Flow [USC	iPM]	10.0793	127.8437	135.9461	1.9769		
	Molar Enthalpy	[Btu/lbmol	e]	-1.148e+005	-9.807e+004	-9.906e+004	-1.228e+005		
	Molar Entropy [Btu/lbmole	-F]	10.79	28.08	26.54	13.24		
				2 7000 02	1 2 2 2 2 - 1 0 4	1 1 100 - 101	107220102		
	Heat Flow [kW]			-3.7090e+03	-1.20/3e+04	-1.4408e+04	-1.97356+05		
	Heat Flow [kW]			-3.7090e+03	-1.20/30+04	-1,4408e+04	-1.37356703		
	Heat Flow [kW]			-3./090e+03	-1.20/30+04	-1,4408e+04	-1.37356703		

Figure 48. Run the simulation and get the results



 \times

E Column: T-100 / COL1 Fluid Pkg: Basis-1 / PRSV

Design	Parame	eters	Rating	Worksheet	Performance	Flowsheet	Dynamics				
Works	heet										
C IN						Mixtur	e	Solvent	Light_L	Heavy_L	
Conditio	ons	H20	C				0.5000	0.0000	0.000	1.0000	
Propert	ies	Ace	etone				0.5000	0.0000	0.1110	0.0000	
Compo	sitions	3-N	hexane				0.0000	1.0000	0.8884	0.0000	
	Delete				F	Run	Rese	t	Converged	Update Outlets	Ignored
•											•

Figure 49. Check of the composition



Figure 50. The obtained results



References

Alexandre C. Dimian, Costin Sorin Bildea, Chemical Process Design: Computer-Aided Case Studies, John Wiley & Sons, Apr 2008 - 527 pages.

Computer-aided Industrial Process Design: The ASPEN Project: Functional Specifications for ASPEN, Sixth Quarterly Progress Report, Department of Chemical Engineering and Energy Laboratory, Massachusetts Institute of Technology Cambridge.

Juma Haydary, Chemical Process Design and Simulation: Aspen Plus and Aspen Hysys Applications, Willey, ISBN: 978-1-119-08911-7, January 2019, 448 Pages.

