Production of cyclohexane from hydrogenation of benzene

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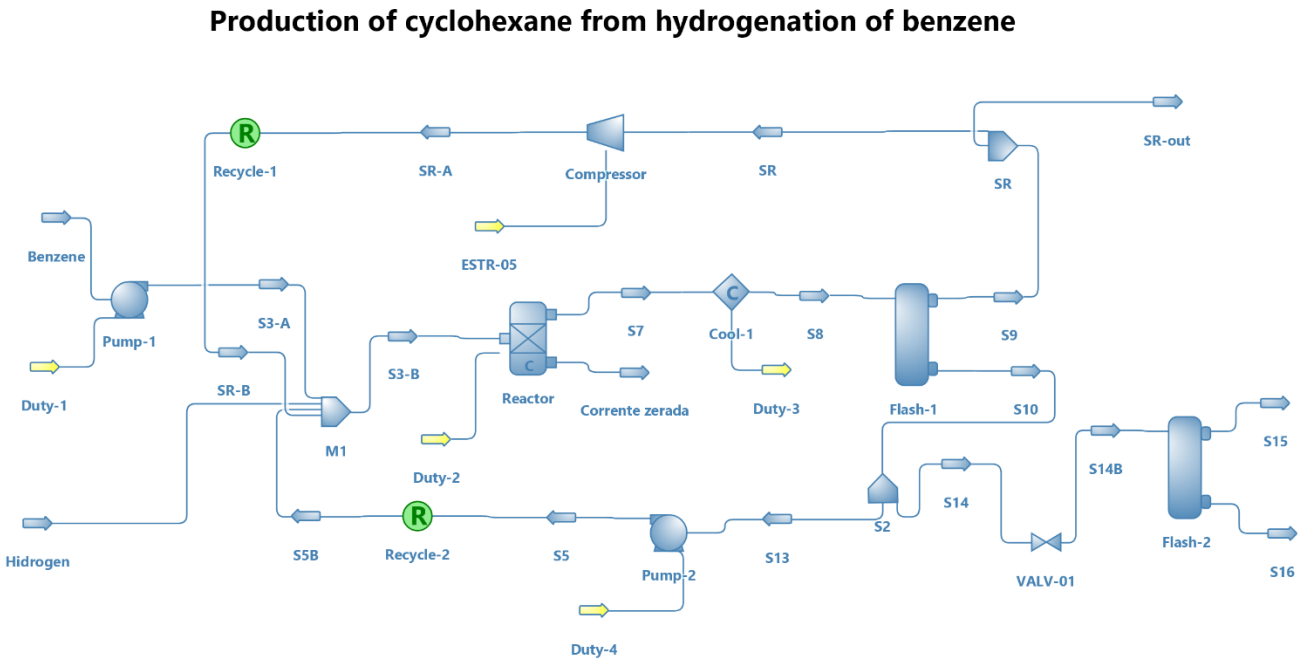
Background & Description:

The production of cyclohexane is carried out from the hydrogenation of benzene. In this flowchart, simulated with the Soave-Redlich-Kwong (SRK) thermodynamic package, production was carried out with a conversion reactor in which the conversion of 99.85% benzene into an adiabatic reactor was fixed. The main equipment used in this flowchart was the conversion reactor and flash vessels. Some important parameters were previously fixed as the point of the flash vessels, in the first pressure was set at 300 psi and 120 ºF; in the second flash, 15 psi pressure. The results of the simulation pointed to a high composition of cyclohexane in the background current of the second flash of 99.85% at a temperature of approximately 120 ºF.

Flowsheet:



Results:

Material Stream					
Object	S16	S15	Hidrogen	Benzene	
Temperature	119,751	119,751	120	100	F
Pressure	15	15	335	15	psi
Molecular Weight (Mixture)	84,1154	32,5691	2,09283	78,1118	lbm/lbmol
Specific Enthalpy (Mixture)	-148,673	17,2259	144,177	-174,708	BTU/lbm
Specific Entropy (Mixture)	-0,226908	0,37705	-2,71529	-0,273579	BTU/[lbm.R]

Reactor		
Object	Reactor	
Pressure Drop	2879,99	lbf/ft2
Benzene: Conversion	99,85	%

Flash			
Object	Flash-2	Flash-1	
Volume	1	1	ft3
Minimum Pressure	101325	101325	psi
Separation Temperature (if overriden)	77	77	F
Separation Pressure (if overriden)	14,696	14,696	psi