Pressure Swing Distillation Of Methanol-Methylal Mixture By Using Water

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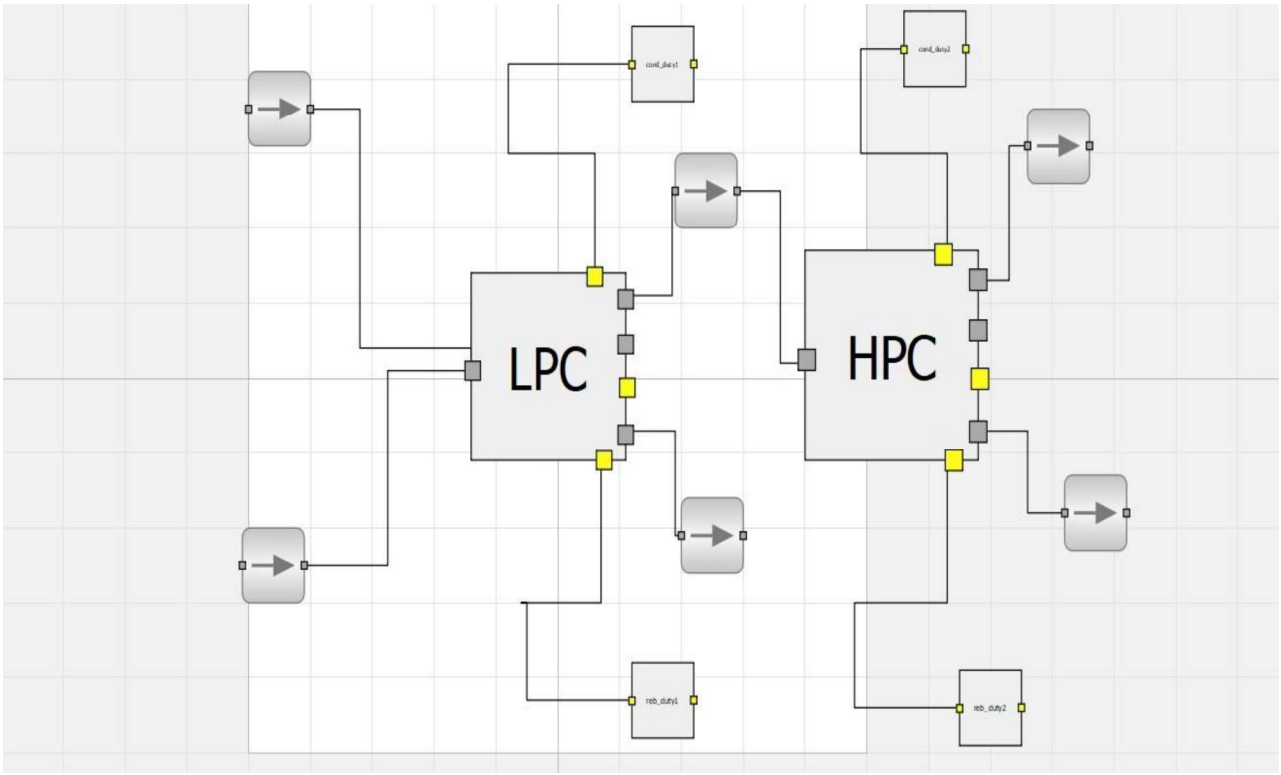
Flowsheet Description:

Here the system used is Methanol, Methylal and water. The thermodynamic package used in this simulation is Raoult's law. In this simulation we use two distillation columns as the name suggest one with the low pressure and another one with the high pressure having 16 and 28 stages respectively. The low pressure column operates at 1 atm and high pressure column operates at 12 atm. The feed with a flow rate of 13.15 mol/s and at a composition of (mole fraction 0.7145 methylal). The feed is introduced at 5 stage in LPC, there are actually two inputs to the LPC feed at 5 and recycled out at 12 stage respectively. After passing through the LPC we achieve our motive actually the bottom is pure methanol while the top containing the mixture of methanol, methylal and water is introduced as a feed to HPC at stage 10.

Flowsheet:



Results:

Results table is shown as below-

Stream	Feed	Recycle	Distillate 1	Distillate 2	Bottom 1	Bottom 2	Unit
Temperature	298.15	412.505	318.494	409.976	337.99	411.323	K
Pressure	101325	1.2E+06	101325	1.2E+06	101325	1.2E+06	Pa
Molar Fraction [1,1]	0.2749	0.3604	0.176	0.0132	0.929	0.2445	
Molar Fraction [1,2]	0.7145	0.635	0.824	0.9024	0.0648	0.7554	
Molar Fraction [1,3]	0.0105	0.0045	3.9E-05	9.5E-09	0.0619	7.3E-05	

References:

1. Baoru Yu, Qiaoyi Wang, and Chunjian Xu;\Design and Control of Distillation System for Methylal/Methanol Separation. Part 2: Pressure Swing Distillation with Full Heat Integration" Ind. Eng. Chem. Res., 2012
2. Qiaoyi Wang, Baoru Yu, and Chunjian Xu;\Design and Control of Distillation System for Methylal/Methanol Separation. Part 1: Extractive Distillation Using DMF as an Entrainer", Ind. Eng. Chem. Res., 2012