Dehydration of Ethanol using Glycerol as Entrainer

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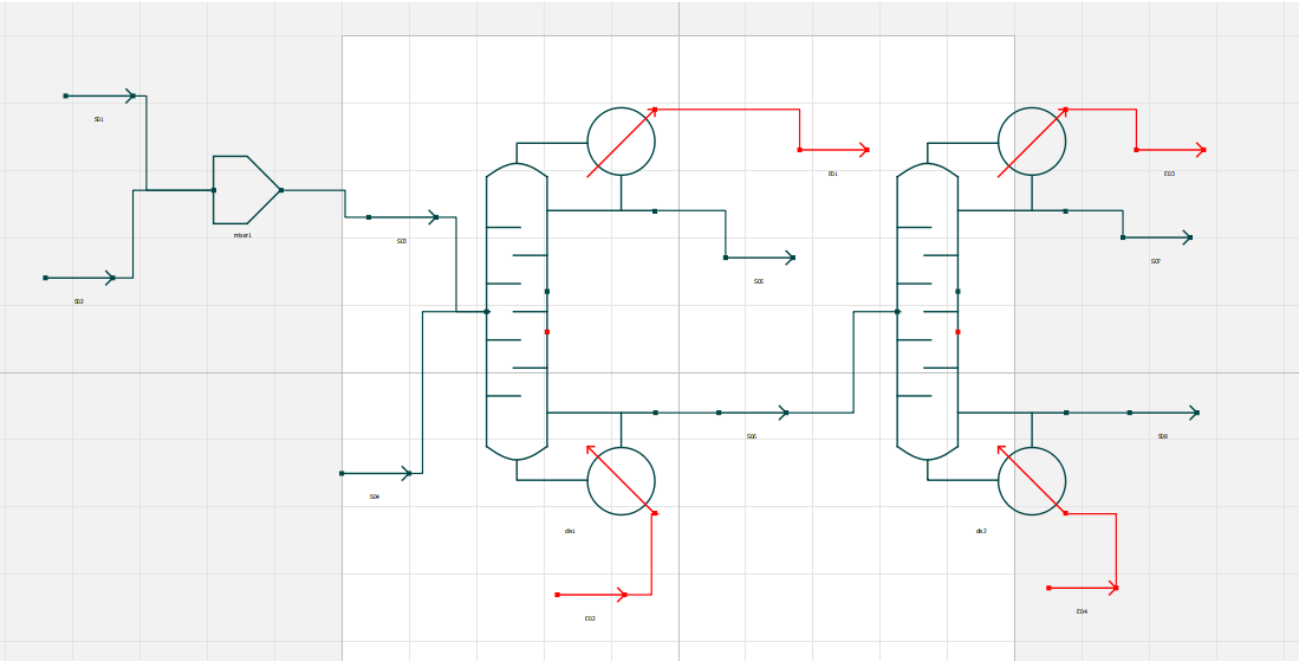
Background & Description:

Ethanol and water form an azeotrope at 95.63% ethanol by mass at 1 atm. One of the ways to separate the mixture is by introducing Glycerol in the mixture as an entrainer. In the flowsheet given below, we first mix the feed mixture with the recycle from the second distillation column. The new mixture is fed into the first distillation column where ethanol is separated from the ethanol-water-glycerol mixture as the distillate.
The bottom product is fed into another distillation column where a fraction of water is recovered as distillate and the bottoms which is a mixture of glycerol and water is recycled back into the feed after adding some glycerol to maintain the proportions.

Flowsheet:



Results:

	Temperature (K)	Pressure (Pa)	Mole flow (mol/s)	Mole fraction (ethanol)	Mole fraction (water)
S01/S08	353.15	2026.5	12.4917	~0	~0
S02	353.15	101325	0.0125	0	0
S04	351.537	101325	27.7778	0.81	0.11
S05	351.585	101325	26.5995	0.9283	0.071
S07	286.651	2026.5	1.21	0.022	0.95