Neat Operation for Separating Methanol-Water

Flowsheet Description:

Neat operation means the condenser duty required in the one column is exactly equal to the reboiler duty in the next column. Here the system used is Methanol-Water. Methanol is more volatile so it is obtained as Distillate in both the units with purity around 99%. The water is obtained from the bottoms in each column which is around 99% pure. The feed composition is 0.6 mole fraction Methanol and 0.4 mole fraction Water flowing at a rate of 1000 mol/s. The feed is split in the ratio of 508.66 and 491.4 mol/s so that the column operates "neat".
The low pressure column-I operates at 60795 Pa and column-II operates at 506625 Pa.

Stream	**Bottoms1**	**Bottom2**	**Distillate1**	**Distillate2**	**Feed**	**Unit**
Temperature	359.408	425.544	325.427	385.477	298.15	K
Pressure	60795	506625	60795	506625	101325	Pa
Molar Flow	201.405	192.716	305.159	298.84	1000	mol/s
Molar Fraction(Mixture)/ Methanol	4.24856e-6	2.03644e-6	0.993376	0.987129	0.6	
Molar Fraction(Mixture)/ Water	0.999996	0.999998	0.00662401	0.0128711	0.4	

References:

Distillation Design and Control using Aspen Simulation, second edition. William L. Lubeyn