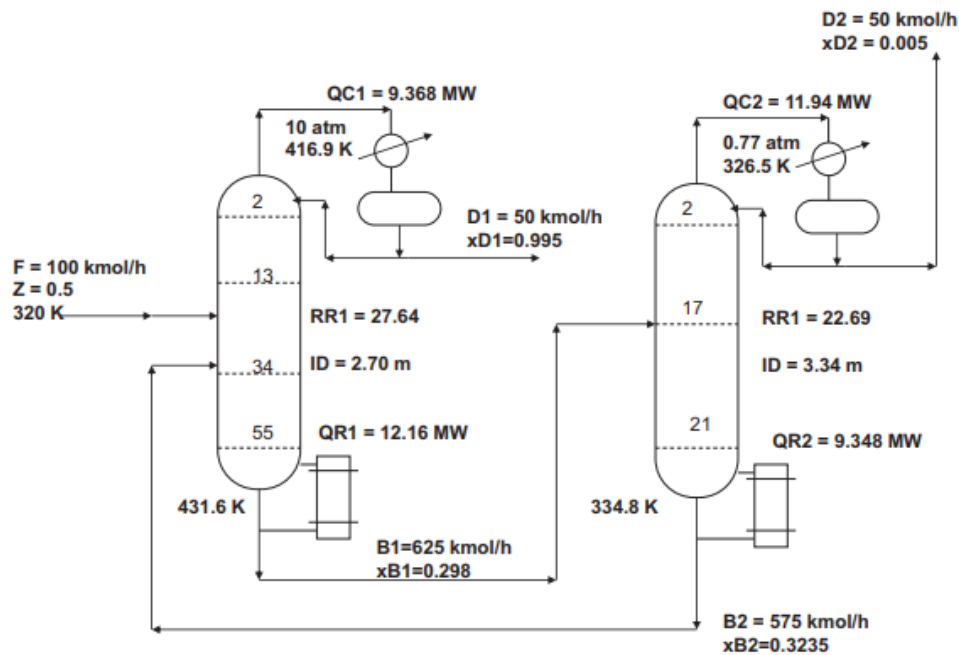


Assignment 3 report **Group 3** **Aditya Kaurav, Harjap Singh**

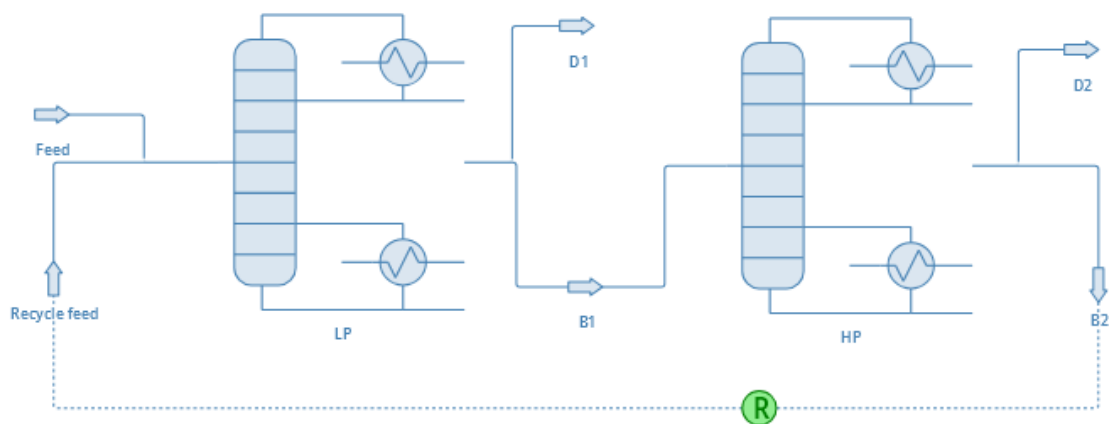
Aditya Kaurav:- Pressure swing distillation work

Harjap Singh:- Extractive distillation work

For **pressure swing distillation** we have used:-



Our system was **Acetone and Chloroform**. So to separate it here we have used pressure swing distillation where two distillation column is used first at low pressure and another at high pressure.



This is the final model in DWSIM that we have created and we have also attached it with mail.

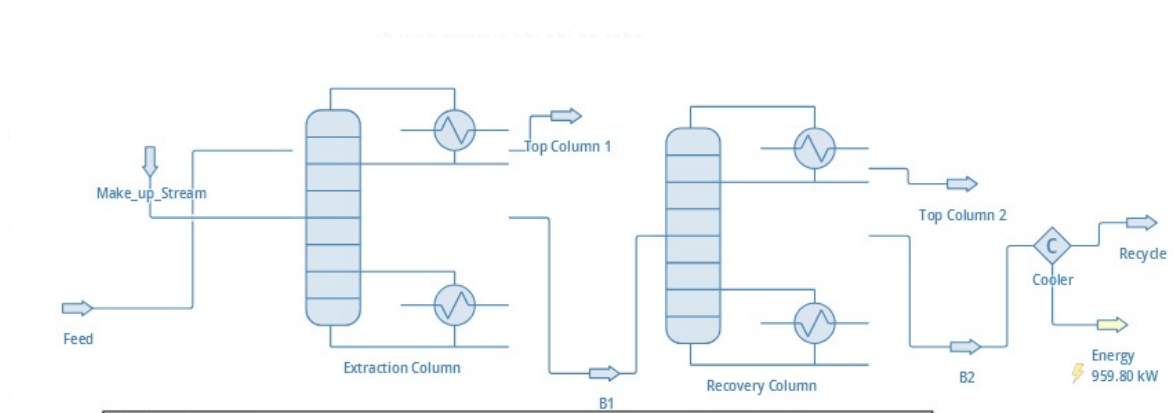
These are the results obtained:-

Master Property Table					
Object	Recycle feed	Feed	D2	B2	
Molar Flow	464.456	100	47.6845	464.456	kmol/h
Molar Fraction (Liquid 1) / Acetone	0.3235	0.5	0.0496252	0.3235	
Molar Fraction (Liquid 1) / Chloroform	0.6765	0.5	0.950375	0.6765	

For **extractive distillation**::-

Here , we use **DMSO -Dimethyl Sulfoxide** as entrainer.Acetone has boiling point near to 56°C and chloroform has about 61°C .So due to their low boiling point difference , extractive distillation become the foremost choice ,which is also seen in results:

Set up:



Raw Data taken :

Feed :

Molar Flow Rate :100 kmol/hr

Acetone :0.5

Chloroform:0.5

Make up stream:

Molar Flow Rate : 164.4kmol/hr

Chloroform : 0.0001

DMSO : 0.9999

Bottom part of Extraction Column:

Molar Flow rate : 214.3 kmol/hr

Bottom part of Recovery Column

Molar Flow rate : 164.4 kmol/hr

Results obtained after taking considering the above data:

Master Property Table					
Object	Top Column 2	Top Column 1	B2	B1	
Molar Flow	49.8989	50.1011	164.401	214.3	kmol/h
Molar Fraction (Mixture) / Acetone	0.0789721	0.919328	1.27399E-08	0.0183883	
Molar Fraction (Mixture) / Chloroform	0.921015	0.0805981	0.000126213	0.214551	
Molar Fraction (Mixture) / Dimethyl sulfoxide	1.25611E-05	7.35472E-05	0.999874	0.76706	

Conclusion:

Based on the above outputs generated in both cases , we can say that extraction distillation works better than pressure distillation in separating the acetone from chloroform .

Reference:

William L. Luyben, "Comparison of extractive distillation and pressure-swing distillation for acetone/chloroform separation " .