Cumene Production

- Export Table Results/Print
- Manipulators - Dupl/Mult
- Analysis Tools - Sensitivity Analysis
- Units - Multitubular PFR v/s CSTR

Problem Statement:

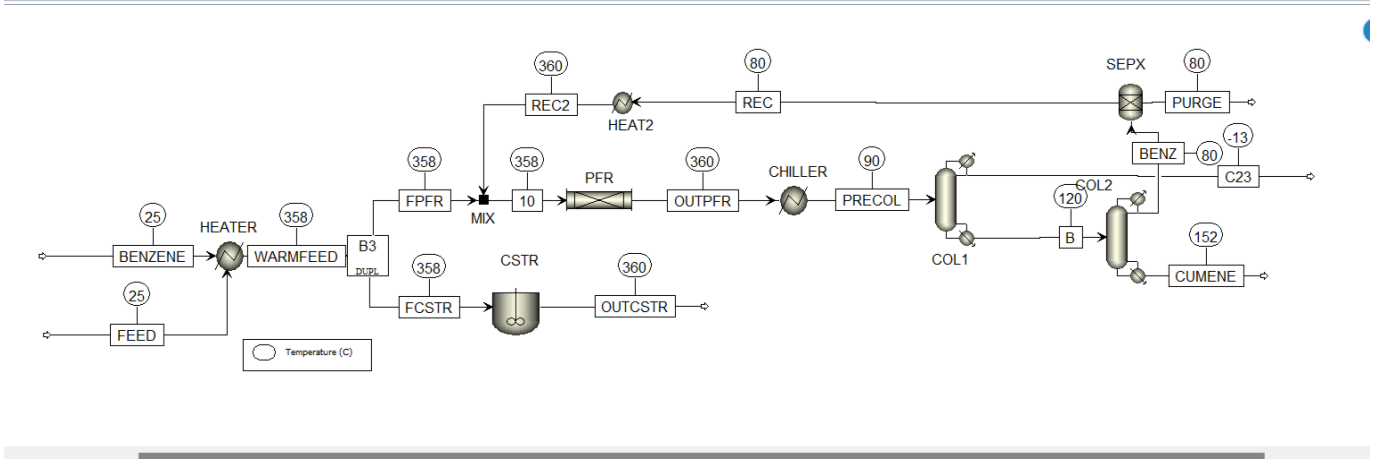
- Cumene (C_9H_{12}) is to be produced from the reaction of benzene and propane
  - C6H6 propylene → Cumene
- The reactor is to be tested in: Multi-tubular PFR, CSTR with same residence time as the PFR
- Conditions:
- T = 25°C, 25 bar → pre-heated to 360°C
- Initially, Benzene flow rate = 300 kmol/h,
- Isopropylene source → 75 kmol/h butane, 225 kmol/h isopropylene
- The best reactor is to be selected as the one to operate

- The producto must be purified via Distillation(s)
- A 99.5%+ Cumene product is required, while maximizing yields
- A single Purge & Recycle is allowed

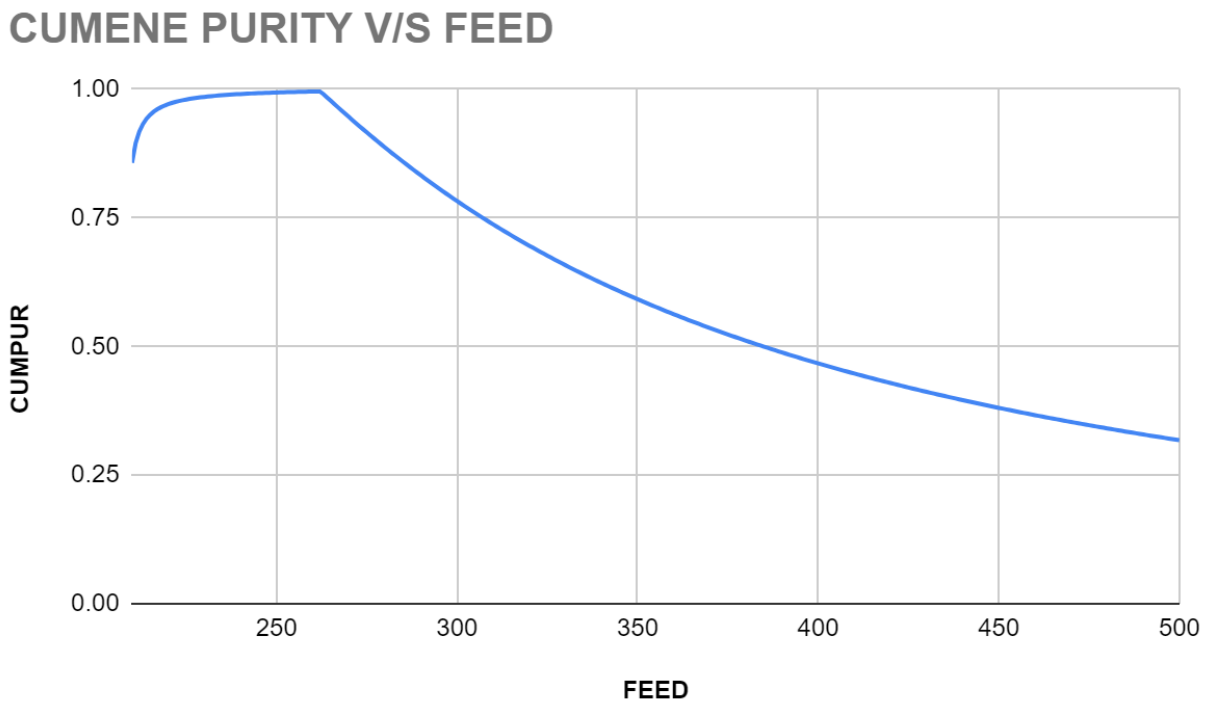
Design Methodology:

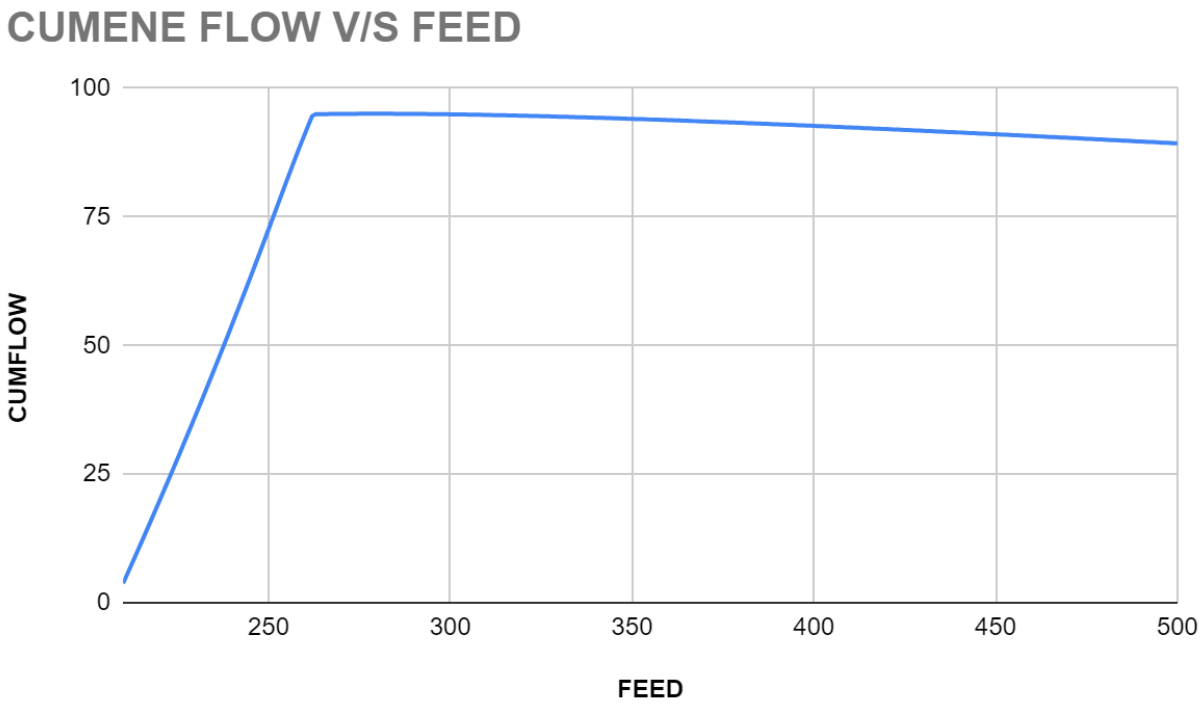
- (A) Run PFR, verify residence time & results
- (B) Use approx. Residence Time for CSTR
- (C) Continue with Reactor: (best choice)
- (D) Add Recycle (Benzene is fully recovered)
- (E) Use Sensitivity Analysis to verify best case scenario for Benzene Feed

MODEL SIMULATION:



Sensitivity Analysis





Results :

Mole Fractions	
BENZENE	5.66872e-05
BUTANE	1.23688e-17
CUMENE	0.995771
PROPY-01	2.95931e-24
P-DII-01	0.00417193