



OBJETIVO

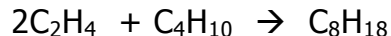
Preparar un diagrama de flujo preliminar para el proceso de producción de n-octano partiendo de etileno e isobutano, en base a los datos proporcionados en el artículo que se usa como referencia

REFERENCIA

Foo et al., "Integrate Process Simulation and Process Synthesis", *Chemical Engineering Progress* **101**(10): Oct 2005, p. 25-29.

PLANTEAMIENTO DEL PROBLEMA

Ethylene and iso-butane react isothermally in a stoichiometric isothermal reactor at 93°C to produce n-octane. The key component that limits the reaction conversion is taken as ethylene, with an overall conversion of 98%. The pressure drop across the reactor is specified at 5 psi. The reaction is



A flash column is added to the reactor effluent to separate the unconverted raw materials from the desired product. A pressure drop of 2 psi is introduced while the operating temperature is maintained the same as that of the reactor. The more-volatile compounds (ethylene, i-butane, and other impurities) are flashed to the top product stream together with a small portion of the heavier product, n-octane, while the remaining n-octane leaves at the bottom.

Distillation is then added to the flash column's top product stream to recover n-octane. The shortcut design method determines that this column has 10 theoretical trays and operates at 15 psia. The remaining n-octane component is recovered at the column bottom while the volatile components leave from the column top.

The unconverted raw material leaving at the distillation top stream is now pure enough for recycle. A purge stream is added before the stream is recompressed, reheated, and sent back to the reactor.

FEED (T = 20°C, P = 25 psia)

Component	Flowrate [kmol/h]
Nitrogen, N ₂	0.1
Ethylene, C ₂ H ₄	20
n-butane, C ₄ H ₁₀	0.5
i-butane, C ₄ H ₁₀	10

PREPARAR UN DIAGRAMA DE FLUJO DEL PROCESO DE ACUERDO A LOS DATOS PROPORCIONADOS, Y UN SEGUNDO DIAGRAMA EN EL QUE SE UTILICE LA CORRIENTE RECIRCULADA PARA PRECALENTAR LA ALIMENTACIÓN