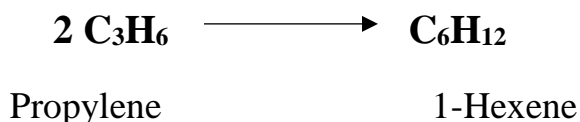


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1-Hexene is the most important C<sub>6</sub> hydrocarbon which is high value co-monomer in the polymer industry particularly in the manufacturing of Polyethylene. It is also used in the process of making a Base Oil which is done by mixing one or more longer chain alpha olefins comprising of C<sub>6</sub>+ olefins. 1-Hexene is produced by oligomerization of propylene. Oligomerizing of two or more olefin molecules in the olefin feed results in the formation of an olefin oligomer that generally comprises a long branched chain molecule with one remaining double bond.

In this process fresh feed consisting of two components propylene and propane (inert) mixed with the recycle stream and enters the reactor. Propylene is converted into 1-Hexene inside the reactor. The Reactions is



Reactor outlet consists of 1-Hexene and unreacted reactants which is cooled and then pressure is reduced to the temperature and pressure at which the flash column is operating. The liquid product is separated out and the unreacted gases are sent back in the form of recycle stream. But before recycling, in order to avoid the buildup of inert material, a part of unreacted gas stream is purged. And the remaining part is pressurized to the reactor pressure before recycling it. Keeping the pressure as constant in the flash column and varying the temperature to observe the changes in the purity of product, product flow rate, recycle rate. Similarly keeping the temperature as constant and varying the pressure in the flash column to observe the changes in the product purity and flowrate. By doing this we can obtain the optimum temperature and pressure in order to obtain the desired purity of the product.

## Process Flowsheet:

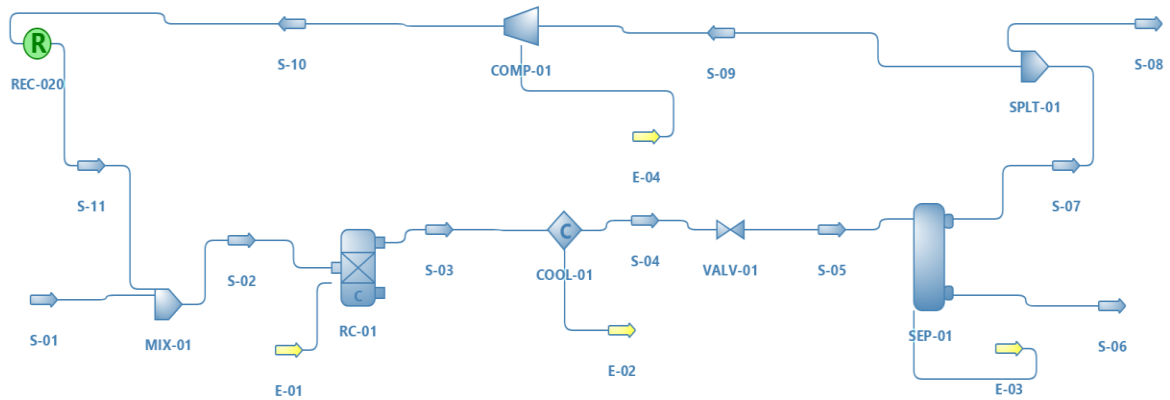


Fig.1 Process Flowsheet of 1-Hexene Production.

## Result:

1-Hexene Production								
Object	S-11	S-10	S-07	S-06	S-03	S-02	S-01	
Temperature	144.176	144.176	120.017	120	200	147.445	150	C
Pressure	20.3898	20.3898	12.2339	12.2339	20.3898	20.3898	20.3898	kgf/cm2
Mass Flow	16462.1	16462.1	16798.1	41673.9	58472	58472	42120.1	kg/h
Molar Flow	162746	162746	166067	313488	479555	738984	577320	m3/d @ BR
Vapor Phase Molar Fraction	1	1	0.999893	0	1	1	1	
Molar Fraction (Mixture) / 1-hexene	0.382632	0.382632	0.382632	0.822202	0.669982	0.0837151	0	
Phases	Vapor	Vapor	Mixed	Liquid	Vapor	Vapor	Vapor	
Energy Flow	772.641	772.641	641.041	-1561.34	4751.28	3037.71	2270.35	kW