

High pressure process for manufacturing of Polyethylene

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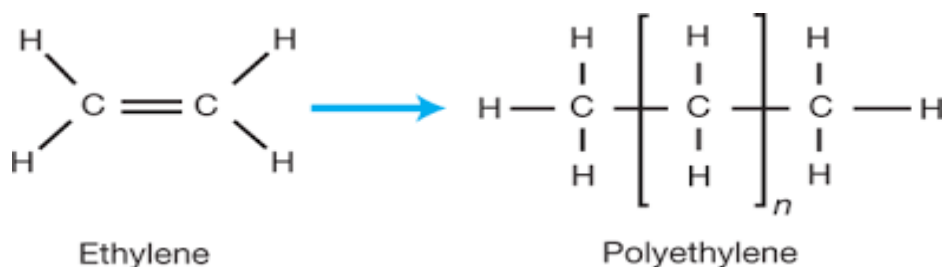
Background & Description:

The word Polymer means many units. Thus polymers are composed of a large number of basic units (small simple molecules) called monomers. The monomers are joined together (end-to-end) by means of chemical reaction to form a polymer. Thus polymer is made up of thousands of monomers joined together to form a large molecule of colloidal dimension called macromolecule. The naturally occurring polymers include protein, cellulose, resins, starch and lignin. There are also artificially prepared polymers such as Polyethylene, Poly vinyl chloride, Polystyrene, Polyester etc...

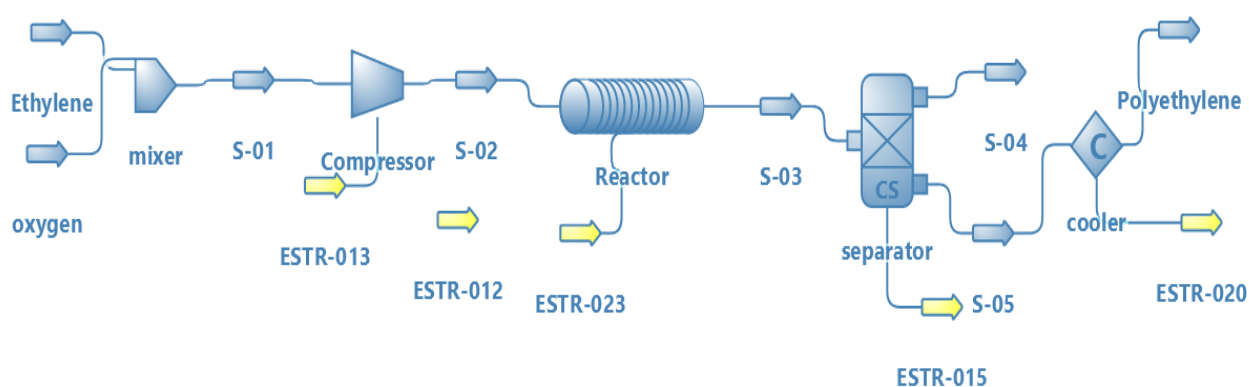
Polyethylene is produced by the Addition polymerization of ethylene monomers. Under suitable condition of temperature or pressure a large number of ethylene molecules polymerize to form large polymer. The double bond present in the molecule of the monomer ethylene disappears in this self-addition process to form Polyethylene.

The process is carried out at very high pressure. The ethylene is mixed with small percentage of oxygen i.e. 0.02 to 0.08 which act as a catalyst. The mixture is then compressed to get high pressure and fed to Reactor, in the reactor conversion is taking place and polyethylene is formed. The polyethylene and unconverted ethylene is taken to separator from where unconverted ethylene is removed. And Polyethylene from separator is cooled to get product.

Reaction:



Flowsheet:



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Results:

The stream wise results are as follows:

Stream wise Results									
Object	oxygen	S-05	S-04	S-03	S-02	S-01	Polyethylene	Ethylene	
Temperature	25	89.3815	89.3815	89.3815	89.3815	24.8605	3.56398	25	C
Mass Flow	1000	1000	1990	2000	2000	2000	1000	1000	g/s
Molar Flow	31.2512	35.6506	66.5413	66.8978	66.8978	66.8978	35.6506	35.6466	mol/s
Volumetric Flow	764530	6.0105	12.1646	1330.86	12.2125	1.63582E+06	13.9913	872060	cm3/s
Molar Flow (Mixture) / Ethylene	0	0.356466	35.2901	35.6466	35.6466	35.6466	0.356466	35.6466	mol/s
Mass Flow (Mixture) / Ethylene	0	10	990	1000	1000	1000	10	1000	g/s
Molar Flow (Vapor Phase) / Ethylene	0	0.356466	35.2901	0	35.6466	35.6466	0.0347934	35.6466	mol/s
Mass Flow (Vapor Phase) / Ethylene	0	10	990	0	1000	1000	0.976064	1000	g/s
Molar Flow (Mixture) / Oxygen	31.2512	0	31.2512	31.2512	31.2512	31.2512	0	0	mol/s
Mass Flow (Mixture) / Oxygen	1000	0	1000	1000	1000	1000	0	0	g/s
Molar Flow (Vapor Phase) / Oxygen	31.2512	0	31.2512	0	31.2512	31.2512	0	0	mol/s
Mass Flow (Vapor Phase) / Oxygen	1000	0	1000	0	1000	1000	0	0	g/s
Molar Flow (Mixture) / polyethylene	0	35.2941	0	0	0	0	35.2941	0	mol/s
Mass Flow (Mixture) / polyethylene	0	990	0	0	0	0	990	0	g/s
Molar Flow (Vapor Phase) / polyethylene	0	35.2941	0	0	0	0	35.2941	0	mol/s
Mass Flow (Vapor Phase) / polyethylene	0	990	0	0	0	0	990	0	g/s