

Removal of Isopentane in Gasoline Manufacturing Plant

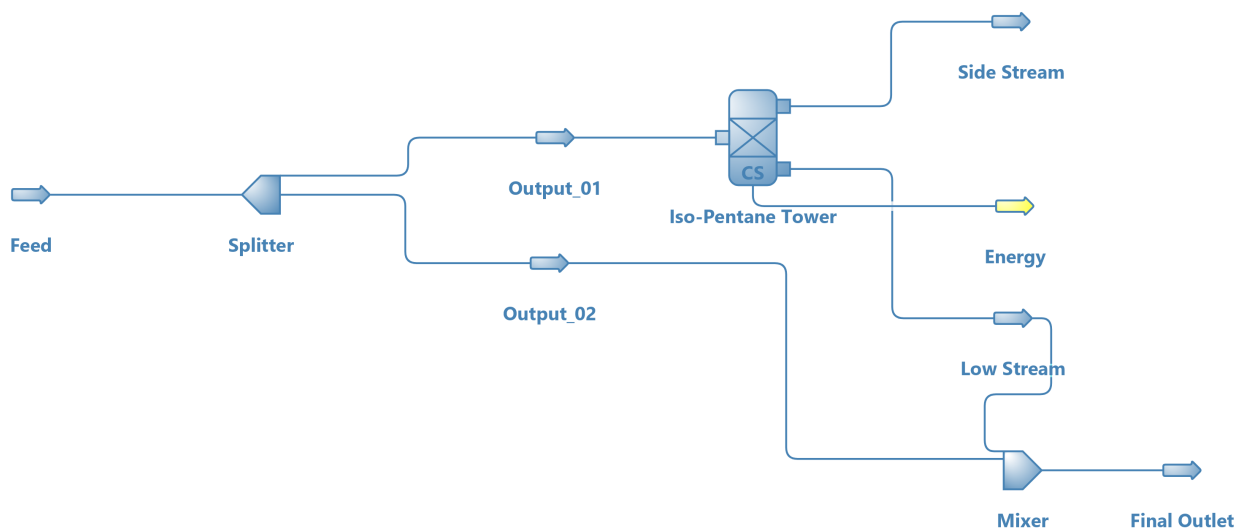
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Background & Description:

Bypass is an important type of process stream commonly encountered in process industries. It skips one or more stages of the process and goes directly to another downstream stage. A bypass stream can be used to control the composition of a final exit stream from a unit by mixing the bypass stream and the unit exit stream in suitable proportions to obtain the desired final composition.

In a feedstock preparation section of a plant manufacturing natural gasoline, it is important to remove isopentane from butane-free gasoline. In this process, butane-free gasoline consisting of N-pentane and isopentane which are obtained from the bottoms of the debutanizer in the ratio of 4:1 is used as feed. 44.5% of the butane-free gasoline directly proceeds to the next stage in the natural gasoline plant. Rest of the butane free gasoline is sent to isopentane tower where isopentane is completely removed as top product and N-pentane is obtained from the bottoms. The obtained pure N-pentane is directly sent to natural gasoline plant. Splitter unit of DWSIM is used to bypass a part of the feed stream and compound separator unit is employed for the isopentane tower.



Results:

Object	Side Stream	Output_02	Output_01	
Temperature	298.15	298.15	298.15	K
Pressure	101325	101325	101325	Pa
Mass Flow	11.1	44.5	55.5	kg/s
Molar Flow	153.8462	616.7706	769.2308	mol/s
Volumetric Flow	0.01798	0.0717	0.08942	m ³ /s
Molar Flow (Mixture) / N-pentane	0	493.4165	615.3846	mol/s
Mass Flow (Mixture) / N-pentane	0	35.6	44.4	kg/s
Molar Flow (Mixture) / Isopentane	153.8462	123.3541	153.8462	mol/s
Mass Flow (Mixture) / Isopentane	11.1	8.9	11.1	kg/s
Object	Low Stream	Final Outlet	Feed	
Temperature	298.15	297.9408	298.15	K
Pressure	101325	101325	101325	Pa
Mass Flow	44.4	88.9	100	kg/s
Molar Flow	615.3846	1232.155	1386.001	mol/s
Volumetric Flow	0.07144	0.14309	0.16112	m ³ /s
Molar Flow (Mixture) / N-pentane	615.3846	1108.801	1108.801	mol/s
Mass Flow (Mixture) / N-pentane	44.4	80	80	kg/s
Molar Flow (Mixture) / Isopentane	0	123.3541	277.2003	mol/s
Mass Flow (Mixture) / Isopentane	0	8.9	20	kg/s

Table 1: Streamwise Results for Removal of Isopentane in Gasoline Manufacturing Plant