



PRODUCTION OF FORMALDEHYDE FROM METHANOL

Rajan Sonaimuthu RA Sethu Institute Of Technology

Background:

Formaldehyde is prepared by the synthesis of **Methanol**(**CH3OH**)**vap**. Methanol is converted into formaldehyde by catalytic vapor phase oxidation over a metal oxide catalyst. In one variation of the process methanol is vaporized, mixed with air, and then passed over the catalyst at 300–600 °C. The formaldehyde produced is absorbed in water and then fed to a fractionating column. Formaldehyde is compound that is ubiquitous in the environment. It is a gaseous contaminant of emissions from power plants, manufacturing sites, and automobiles.

 $CH_3OH \rightarrow CH_2O + H_2 \Delta H = 84 \text{ kJ/mol}$

Description of the Flowsheet:

Methanol is entering to the conversion reactor with the temperature of 250C and the mass flow is **1600 kg/h** with pressure of **1 bar**. The conversion reactor gives two output the **MSTR-06** gives Formaldehyde and hydrogen in high amount compare to methanol but **MSTR-07** gives more than **90%** is methanol and the both MSTR-06 and **MSTR-07** are comes from catalytic reactor

The two outputs are connected to the Steam mixer and the with the property package of **Roult's Law**, and the output is **MSTR-08** which has **37%** of both Formaldehyde and Hydrogen. The methnol has **24%** of value the overall value of the methanol reactant and passes with the same mass flow with different molar flow.

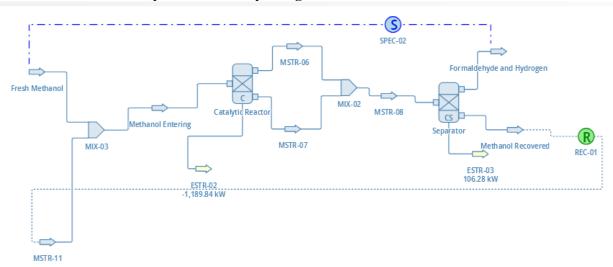
The MSTR-08 is connected to the **compound sepeator** and it seperates the Formaldehyde and Hydrogen. The another output is Methanol Recovered from the reaction happend it can be reused by the **Recycle Block** and that is connected to the MSTR-11 it has going through the mixer and the another line is connected from the **Specification Block** It is comes from the Formaldehyde and hydrogen outlet in that the samll amount of methanol is present and the mixer is goes to the **Methanol Entering** Block with this the methanol is recovered.





Flowsheet:

Production Of Formaldehyde Flowsheet By Using Methanol



Results:

Master Property Table				
Object	Vapour Stream	Liquid Stream	Formaldehyde and Hydrogen	
Temperature	25	25	25.0001	С
Pressure	1.01325	1.01325	1.01325	bar
Mass Flow	1273.29	327.149	959.869	kg/h
Molar Flow	69.6525	10.2649	59.9134	kmol/h
Volumetric Flow	1703.98	0.417452	1465.72	m3/h
Molar Enthalpy (Mixture)	-0.000293087	-36430.9	0.00377225	kJ/kmol
Molar Entropy (Mixture)	30.5618	-119.66	24.4371	kj/[kmol.K]
Mass Flow (Mixture) / Formaldehyde	873.677	26.1728	899.479	kg/h
Phases	V+L	L	V	

Conclusion:

Thus, DWSIM is used to simulate Production of Formaldehyde from Methanol.