

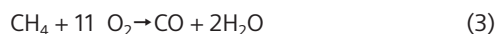
Petrochemical Industry Methanol Plant

Process Gas Chromatograph Application Note

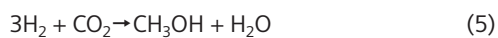
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The use of methanol is commonly used in the chemical industry as an industrial solvent due to its excellent ability to dissolve most organic and many inorganic compounds. Methanol is also used as a reagent to form formaldehyde and methyl esters as well as antifreeze for automobiles and aircraft.

To meet the huge demand for methanol, various chemical plants have been built that react natural gas with steam. The methanol process consists of natural gas that has been desulfurized and sent through dual-stage reformers in which methane and/or other light hydrocarbons are reacted with steam and then pure oxygen according to the reactions:



The effluent stream is compressed to synthesis pressure and passed to the synthesis reactor that consists of a number of catalyst beds. The following reactions take place:



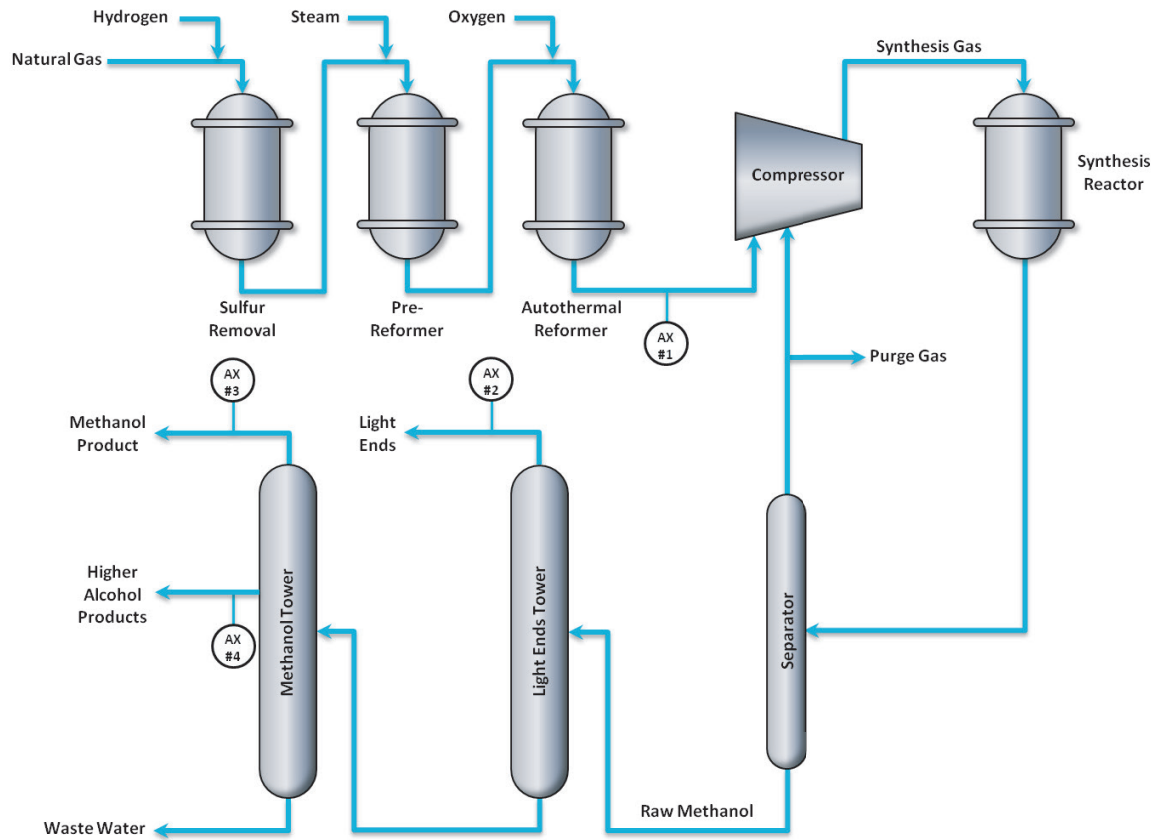
The unreacted gas is separated from the crude methanol and is recycled through the synthesis convertor. A portion of the recycle gas is purged to prevent a buildup of light material. The purge gas is often sent to the reformer furnace to use as fuel. The liquid product from the separator is sent to the fractionation section where the light ends are removed and the methanol product is separated from higher alcohols and waste water in a methanol tower.

Typical GC Measurements

The operation of a methanol plant has a number of process gas chromatograph measurement possibilities for optimum plant operation:

- 1. Autothermal Reformer Effluent** – monitors the level of unreacted methane which helps the control system keep the reformers at the optimum conversion severity.
- 2. Light Ends Tower Overhead** – measures methanol to minimize the loss of methanol in the light ends stream.
- 3. Methanol Product** – measures ethanol to monitor for impurities in the methanol product stream.
- 4. Higher Alcohol Product** – measures methanol to minimize the loss of methanol in the higher alcohol product stream.

Methanol Plant



Analyzer No.	Stream	Components Measured	Measurement Objective
1	Reformer Effluent	Methane	Monitors levels of unreacted methane to optimize the Reformer efficiency
2	Light Ends Tower Overhead	Methanol	Minimize losses of Methanol in the Light Ends
3	Methanol Product	Ethanol	Methanol product purity control
4	Higher Alcohol Products	Methanol	Minimize losses of the methanol in the Higher Alcohol product stream

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