



Emission Control of Methyl Chloride Process Streams

Introduction

There are several methods that can be employed to reduce or remove methyl chloride vapors from process vent streams; the most common methods are condensation and incineration. These methods, along with several other options, are summarized below.

Incineration

Incineration is commonly used to eliminate methyl chloride emissions from process vents. Methyl chloride is destroyed by thermal oxidation, which converts it to HCl, CO₂, and H₂O. Excess acidity can then be removed from the incinerator vent by scrubbing with water or caustic.

Condensation

Routing the process vent stream through a refrigerated heat exchanger (chiller) to condense methyl chloride vapors is one way of recovering methyl chloride from the vent. The suitability of this option is largely determined by the concentration of methyl chloride in the vapor, the throughput, the vapor pressure of other system components, and the operating pressure and temperature of the heat exchanger. The presence of water in the vent gas should be considered carefully in the design of condensation systems (See Methyl Chloride Hydrate Formation below). The biggest advantage of employing condensation is that the condensed liquid can normally be returned to the process.

Condensation schemes utilizing cooling water are also utilized, but to be effective the stream must be at least 80% (by volume) methyl chloride and first be compressed to at least 130 psig.

Organic Scrubbing

A scrubber system utilizing an organic solvent with 1) a lower vapor pressure than methyl chloride and 2) a reasonably high methyl chloride solubility can be used to reduce methyl chloride concentrations in vent gases. For example, a packed tower circulating chilled perchloroethylene might be used to absorb the methyl chloride vapors. This option is especially attractive when the absorbing liquid can be recycled to the process. If this is not the case, additional equipment to strip out and recycle the methyl chloride may be required.

Carbon Adsorption

Activated carbon has a very low affinity for methyl chloride and is therefore inefficient as an emission control technology for process vents. However, carbon can be utilized in removing low concentrations of methyl chloride and in removal of methyl chloride from water where pressure can be employed to improve efficiency.

Caustic Scrubbing

Theoretically, caustic soda (sodium hydroxide) could be used to convert (hydrolyze) methyl chloride to methanol and dimethyl ether. However, the solubility of methyl chloride in caustic is minimal and the conversions are quite low.

Methyl Chloride Hydrate Formation

Methyl chloride hydrate, CH₃Cl · 6 H₂O, is a solid which forms at about 55°F and 20 to 25 psig. It is possible that a methyl chloride vapor recovery system utilizing this reaction could be designed; however, to our knowledge this process is not presently employed for methyl chloride emissions reduction.

Further Information

More detailed information on methyl chloride is available upon request through the OxyChem Technical Service Department. Call or write to:

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