

SUBSTANCE SPECIFIC

METHANOL

What is Methanol

Methanol is a clear flammable and toxic alcohol. Methanol is a highly polar solvent meaning it is soluble in water. Methanol has a vapour pressure that is moderately high and as such evaporates and becomes airborne readily. Methanol has a freezing point of approximately -100°C and as such is commonly used as an anti-freeze. Methanol has many uses, but within the oil and gas industry it is commonly used for hydrate inhibition and corrosion control.

Where is it Found

Methanol is used in oil and gas in a pure form as an anti-freeze for hydrate inhibition or for gas dehydration. As a mixture, methanol is found in many oil and gas chemicals such as corrosion inhibitors. Because methanol is water soluble it may be found in appreciable concentrations in produced water and flow back water where methanol has been used.

The Risks**Health Effects**

Methanol is one of the top chemical injuries in oil and gas with many workers getting methanol sprayed into their eyes and face. Elevated methanol exposures can result in headache, visual disturbances and potential blindness. The main health effect of concern with methanol is blindness as methanol is metabolized by the body into formic acid, which destroys the optic nerve. Methanol is slow to be removed from the body and as such can accumulate in tissues and blood.

Methanol has a full-shift exposure level of 200 ppm and a short-term 15-minute exposure level (STEL) of 250 ppm. Since the STEL is only slightly higher than the full-shift amount, controlling exposures to the STEL in most cases will afford protection against the full-shift exposure level too.

Primary Routes of Exposure

Methanol as with many chemicals can find its way into the body by way of inhalation, ingestion and injection. Methanol can also be significantly absorbed through skin contact.

Fire and Explosion

Methanol is highly flammable and in its pure undiluted form it is classified as a Category 2 flammable according to WHMIS 2015. Methanol within water is classified as a Category 3 flammable hazardous product when at an approximately 10% concentration of methanol in water. Methanol burns with a blue flame and therefore may not be visible. Methanol also has a large flammable range with a lower explosive limit of approximately 6% and an upper limit of approximately 40%. This large range is not typical for most oil and gas flammable liquids and as such it is possible to have flammable limits within process equipment that are atmospherically vented such as production tanks.

Exposure Assessment

Exposure assessment typically involves the collection of sorbent tubes using an air sampling pump. For bulk analysis of mixtures such as produced water, a sample without any hydrocarbon layers is required and specific analysis for methanol has to be requested of the laboratory.

Exposure Control

Prevention of methanol exposure should be achieved by substitution when feasible and engineering controls. When this is not always feasible or when the residual risks dictate control, personal protective equipment shall be used.

Personal protective equipment shall include chemically resistant gloves such as butyl rubber and in the case where a respirator is required the use of supplied air. Air purifying respirators are not recommended by respirator manufacturers because methanol is too volatile to be captured with absorbent media such as charcoal or silica gel.

PRECAUTIONS YOU SHOULD TAKE

- Ask your employer if methanol is being used onsite (maybe used seasonally)
- Follow the safe working procedures provided by your employer
- Have you considered the health effects of methanol exposure?
- Use NIOSH Method 2000
- Understand what OEL you are going to compare your results to