

# Methane

### **What it is:**

- Chemical symbol: CH<sub>4</sub>
- Methane is the simplest of the alkanes, a family of 100-plus compounds, each of which consists only of carbon and hydrogen atoms. Other common alkanes include propane (C<sub>3</sub>H<sub>8</sub>), butane (C<sub>4</sub>H<sub>10</sub>) and octane (C<sub>8</sub>H<sub>18</sub>).
- Colorless, odorless. Common form is a gas (boils at -161 degrees C, or -258 F).
- Dissolves in water, but does not ionize. Solubility in water at 10 degrees C (50 F) is 42 mg/L. As water temperature increases, CH<sub>4</sub> solubility decreases.
- Less dense than air at room temperature.

### **Occurrence:**

- Methane is common in nature, resulting from anaerobic digestion of plant and animal matter. Also called "swamp gas," "biogas," or, in coal mines, "fire-damp" or "coal-gas."
- Naturally dissolved in some groundwaters, especially near petroleum deposits or coal seams.
- It is principal constituent (75 percent or more) of natural gas used for heating, etc. Odor is added to nat-

ural gas to make it detectable.

- Can be manufactured, and is used in some industrial processes.

### **Effects:**

- Non-toxic, but can produce suffocation by replacing oxygen in confined air space. Can be absorbed into the body by inhalation.
- Flammable and potentially explosive when mixed with air.
- When dissolved in water, it can give water a milky look, or "swampy" odor and taste.

### **Regulation:**

- The US Environmental Protection Agency (EPA) does not regulate the methane content of drinking water.
- *Safety:* To avoid fire or explosion, gaseous methane should be kept away from sparks, flames or spark-producing tools, and should be vented out of buildings. Follow all applicable OSHA, fire-safety and other rules.

### **Water treatment:**

Aeration in an atmospheric tank is effective. Methane is not filterable or removable chemically.

#### *Recommendations for aeration:*

- Prefilter to avoid particle or precipitate blockage of spray nozzles.
- Disinfection (typically chlorination) of aeration-system feedwater is recommended to avoid biofouling/contamination, especially in warmer climates.
- Aeration-released methane must be ventilated from tank to the outdoors, preferably operating 24/7.

