

# **Syngas**

## **Product Stewardship Summary**

### **Chemical Information**

Syngas, also known as synthesis gas, is often produced from a mixture of water, in the form of steam, and methane. The composition of syngas varies, but the 2 major components are hydrogen and carbon monoxide which make up 98-99% of the total. The hydrogen concentration can vary from 50 to 65% and the carbon monoxide can vary from 30 to 45%. Syngas can also be produced from coal, biomass, or nearly any other hydrocarbon feedstock. Syngas may require additional purification to clean up various contaminants, like ash, sulfur containing gases and chlorides, depending on how it is produced.

Syngas can be used to make a variety of products. One of the more common applications is to make pure hydrogen and carbon monoxide or in some cases, carbon dioxide via a process known as steam-methane reforming. In this process, the hydrogen and carbon monoxide or carbon dioxide are separated from each other and purified. Once purified, the products can be transported to users in a pipeline, tanker truck, railcar, or gas cylinders.

At standard temperature and pressure, hydrogen and carbon monoxide are colorless, odorless, tasteless, and flammable gases. Hydrogen is classified as a simple asphyxiant, but carbon monoxide is toxic.

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### **Applications, Benefits, & Use**

**Chemicals:** Syngas is used as a raw material in the production of hydrogen. Syngas can also be used to make a variety of other building block materials like ammonia, methanol, and other basic hydrocarbons. Other reactions with syngas can produce dimethyl ether or diesel fuel.

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### **Regulatory Information**

There are regulations that govern the manufacture, sales, transportation, use and/or disposal of syngas. These regulations vary by city, state, country or geographic region. Additional regulatory information may be found on the Safety Data Sheet for carbon monoxide as well as local and federal agency websites.

## **Human Health and Environmental Effects**

### **Human Health:**

- Syngas contains carbon monoxide, which is a chemical asphyxiant. The toxic action of carbon monoxide is caused by combining with the hemoglobin in the blood to form the relatively stable carboxyhemoglobin. The stability of the carboxyhemoglobin prevents oxygen from being taken up by the body and consequently the body is deprived of needed oxygen.
- Syngas is not classified as a poison at the normal levels of carbon monoxide present, but it can be fatal after just a few minutes of exposure.

### **Environment:**

- Syngas is a pollutant, which can affect workers by causing headaches and dizziness.

## **Exposure Potential and Risk Mitigation Measures**

### **Industrial Use:**

- Syngas is shipped as a flammable gas, most commonly in pipelines.
- Use atmospheric and personal monitors to ensure carbon monoxide levels do not exceed occupational exposure limits.
- Personnel should be trained on the hazards and risks of syngas and carbon monoxide.
- Precautions for the flammability of syngas include no smoking and the use of proper electrical equipment. All ignition sources must be eliminated when working with flammable gas.
- Occupational exposure limits for carbon monoxide are:  
ACGIH, 8 hr, TLV-TWA - 25 ppm  
OSHA, 8 hr, PEL - 50 ppm

### **Consumer Use:**

- None known.

## **Additional Sources of Information**

- Air Liquide Safety Data Sheets
- American Chemistry Council
- Compressed Gas Association (G-5.7)

## **Contact Information**

For matters related to health, safety, security, environment or Responsible Care® commitments, contact us by phone at 713-438-6721 or by [email](#).