



# Syngas

## Product Stewardship Summary

### Chemical Information:

Syngas, also known as synthesis gas, is often produced from a catalyzed reaction of a mixture of steam and methane (steam methane reforming). Syngas can also be produced from coal, biomass, and other hydrocarbon feedstocks. The composition of syngas varies, but the major components are hydrogen, carbon dioxide, and carbon monoxide (dry basis). Depending on how it is produced, syngas may require additional purification.

Syngas can be used to remove various contaminants, such as ash, sulfur containing gases and chlorides. One of the more common applications is to separate and purify the hydrogen, carbon dioxide and carbon monoxide. Once purified, the products can be transported to users in a pipeline, tanker truck, rail tank car, tube trailer, or gas cylinders. When Syngas is the finished product, the CO<sub>2</sub> and water are removed and the H<sub>2</sub> to CO ratio is adjusted as required by the end user.

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. Carbon dioxide is a colorless, odorless, tasteless, and non-flammable gas. Carbon dioxide is heavier than air and can easily become an asphyxiant. The hazards of syngas are based on the composition.

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## Applications, Benefits and Use

**Chemicals:** Syngas can be a product or it can be used in the production of hydrogen, carbon monoxide or carbon dioxide. Syngas can also be used to produce a variety of other building block materials like ammonia, methanol, and other basic hydrocarbons. Other reactions with syngas can produce dimethyl ether or liquid fuels.

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### Regulatory Information:

There are regulations that govern the manufacture, sale, transportation, use and/or disposal of carbon monoxide and hydrogen. These regulations vary by city, state and geographic region. Additional regulatory information may be found on the Safety Data Sheet for carbon monoxide and hydrogen 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 into 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. At lower concentrations it can cause workers to have headaches and dizziness.

### Environment:

- Syngas is a pollutant when released because it contains carbon monoxide.

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## Exposure Potential and Risk Mitigation Measures

### Industrial Use:

- Syngas is shipped as a flammable gas, most commonly in pipelines.
- Atmospheric and personal monitors should be used 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:

- Syngas is transported by pipeline, exposure to direct consumers is not anticipated.

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### 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 [us-allius-rcms@airliquide.com](mailto:us-allius-rcms@airliquide.com)