



# n-Butane (0.00001% - 40.00%), Propane (0.00001% - 40.00%), Ethane (0.00001% - 99.99996%), Hydrogen (0.00001% - 99.99996%) in Methane

## Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 10/20/2015 Version: 2.0

### SECTION 1: Identification

#### 1.1. Identification

Product form : Mixture  
Product name : n-Butane (0.00001% - 40.00%), Propane (0.00001% - 40.00%), Ethane (0.00001% - 99.99996%), Hydrogen (0.00001% - 99.99996%) in Methane  
Product code : SG-2005-04235

#### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Test gas/Calibration gas.

#### 1.3. Details of the supplier of the safety data sheet

Air Liquide  
9811 Katy Freeway, Suite 100  
Houston, TX 77024 - USA  
T 1-800-819-1704  
[www.us.airliquide.com](http://www.us.airliquide.com)

#### 1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300

### SECTION 2: Hazard(s) identification

#### 2.1. Classification of the substance or mixture

##### GHS-US classification

Flam. Gas 1	H220 -	Extremely flammable gas
Compressed gas	H280 -	Contains gas under pressure; may explode if heated

Full text of H-phrases: see section 16

#### 2.2. Label elements

##### GHS-US labeling

Hazard pictograms (GHS-US) :



Signal word (GHS-US) :

Danger

Hazard statements (GHS-US) :

H220 - Extremely flammable gas  
H280 - Contains gas under pressure; may explode if heated  
OSHA-H01 - May displace oxygen and cause rapid suffocation  
CGA-HG04 - May form explosive mixtures with air

Precautionary statements (GHS-US) :

P202 - Do not handle until all safety precautions have been read and understood  
P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking  
P271 - Use only outdoors or in a well-ventilated area  
P280 - Wear eye protection, face protection, protective gloves, protective clothing  
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing  
P308+P313 - If exposed or concerned: Get medical advice/attention  
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely  
P381 - Eliminate all ignition sources if safe to do so  
P403 - Store in a well-ventilated place  
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations  
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)  
CGA-PG05 - Use a back flow preventive device in the piping  
CGA-PG06 - Close valve after each use and when empty  
CGA-PG10 - Use only with equipment rated for cylinder pressure  
CGA-PG14 - Approach suspected leak area with caution  
CGA-PG21 - Open valve slowly

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### 2.3. Other hazards

No additional information available

### 2.4. Unknown acute toxicity (GHS US)

Not applicable

## SECTION 3: Composition/Information on ingredients

### 3.1. Substance

Not applicable

### 3.2. Mixture

Name	Product identifier	%	GHS-US classification
Ethane	(CAS No) 74-84-0	0.00001 - 99.99996	Flam. Gas 1, H220 Liquefied gas, H280
Methane	(CAS No) 74-82-8	0.00001 - 99.99996	Flam. Gas 1, H220 Compressed gas, H280
Hydrogen	(CAS No) 1333-74-0	0.00001 - 99.99996	Flam. Gas 1, H220 Compressed gas, H280
n-Butane	(CAS No) 106-97-8	0.00001 - 40	Flam. Gas 1, H220 Liquefied gas, H280
Propane	(CAS No) 74-98-6	0.00001 - 40	Flam. Gas 1, H220 Liquefied gas, H280

Full text of H-phrases: see section 16

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

- First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.
- First-aid measures after skin contact : Adverse effects not expected from this product.
- First-aid measures after eye contact : Adverse effects not expected from this product.
- First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

### 4.2. Most important symptoms and effects, both acute and delayed

- Symptoms/injuries after inhalation : May displace oxygen and cause rapid suffocation.
- Symptoms/injuries after skin contact : Adverse effects not expected from this product.
- Symptoms/injuries after eye contact : Adverse effects not expected from this product.
- Symptoms/injuries after ingestion : Ingestion is not considered a potential route of exposure.
- Symptoms/injuries upon intravenous administration : Not known.
- Chronic symptoms : Adverse effects not expected from this product.

### 4.3. Indication of any immediate medical attention and special treatment needed

If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

- Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.
- Unsuitable extinguishing media : Do not use water jet to extinguish.

### 5.2. Special hazards arising from the substance or mixture

- Fire hazard : This product is flammable.
- Explosion hazard : Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries. May form flammable/explosive vapor-air mixture.
- Reactivity : None known.

### 5.3. Advice for firefighters

- Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire.
- Protection during firefighting : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

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### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

##### 6.1.1. For non-emergency personnel

Protective equipment : Wear protective equipment consistent with the site emergency plan.  
Emergency procedures : Escape the danger area by the closest safe route. Close doors and windows of adjacent premises. Keep containers closed. Mark the danger area. Seal off low-lying areas. Keep upwind.

##### 6.1.2. For emergency responders

Protective equipment : Standard protective clothing and equipment (e.g., Self Contained Breathing Apparatus) for fire fighters. Equip cleanup crew with proper protection.  
Emergency procedures : Evacuate and limit access. Ventilate area. Remove ignition sources. Monitor concentration of released product. Consider the risk of potentially explosive atmospheres. Wear self-contained breathing apparatus when entering atmospheres of unknown contaminant concentration until proven to be safe.

#### 6.2. Environmental precautions

Try to stop release if safe to do so.

#### 6.3. Methods and material for containment and cleaning up

For containment : Try to stop release if safe to do so.  
Methods for cleaning up : Dispose of this material and its container in accordance with local regulations.

#### 6.4. Reference to other sections

See also Sections 8 and 13.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Handle empty containers with care because residual vapors are flammable. In use, may form flammable vapor-air mixture.  
Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Use only non-sparking tools.  
Hygiene measures : Do not eat, drink or smoke when using this product.

#### 7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations. Proper grounding procedures to avoid static electricity should be followed.  
Storage conditions : Do not expose to temperatures exceeding 52°C (125°F). Keep container closed when not in use. Protect cylinder from physical damage. Store in well ventilated area.  
Incompatible products : None known.  
Incompatible materials : Oxidizing materials. Air.

### SECTION 8: Exposure controls/personal protection

#### 8.1. Control parameters

n-Butane (106-97-8)		
ACGIH	ACGIH STEL (ppm)	1000 ppm
Propane (74-98-6)		
ACGIH	ACGIH TWA (ppm)	1000 ppm
OSHA	OSHA PEL (TWA) (mg/m <sup>3</sup> )	1800 mg/m <sup>3</sup>
OSHA	OSHA PEL (TWA) (ppm)	1000 ppm
Ethane (74-84-0)		
ACGIH	ACGIH TWA (ppm)	1000 ppm

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Methane (74-82-8)		
ACGIH	ACGIH TWA (ppm)	1000 ppm

### 8.2. Exposure controls

Appropriate engineering controls	: Ensure exposure is below occupational exposure limits. Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Oxygen detectors should be used when asphyxiating gases may be released. Consider work permit system e.g. for maintenance activities.
Hand protection	: Wear working gloves when handling gas containers. 29 CFR 1910.138: Hand Protection.
Eye protection	: Wear safety glasses with side shields. 29 CFR 1910.133: Eye and Face Protection.
Skin and body protection	: Wear suitable protective clothing, e.g. - lab coats, coveralls or flame resistant clothing.
Respiratory protection	: None necessary during normal and routine operations. See Sections 5 & 6.
Thermal hazard protection	: None necessary during normal and routine operations.
Environmental exposure controls	: Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.
Other information	: Wear safety shoes while handling containers. 29 CFR 1910.136: Foot Protection.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Clear, colorless gas.
Color	: Colorless
Odor	: slight petroleum-like odor
Odor threshold	: No data available
pH	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: See Section 2.1 and 2.2
Explosion limits	: No data available
Explosive properties	: Without adequate ventilation formation of explosive mixtures may be possible.
Oxidizing properties	: None.
Vapor pressure	: No data available
Relative density	: No data available
Relative vapor density at 20 °C	: No data available
Molecular mass	: Not applicable for gas-mixtures.
Relative gas density	: Heavier than air
Solubility	: No data available
Log Pow	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available

### 9.2. Other information

Additional information	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
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### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

None known.

#### 10.2. Chemical stability

Stable under normal conditions.

#### 10.3. Possibility of hazardous reactions

Can form explosive mixture with air.

#### 10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

#### 10.5. Incompatible materials

Oxidizing materials. Air.

#### 10.6. Hazardous decomposition products

Under normal conditions of storage and use hazardous decomposition products should not be produced.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Acute toxicity : Not classified

<b>n-Butane (106-97-8)</b>	
LC50 inhalation rat (mg/l)	658 g/m <sup>3</sup> (Exposure time: 4 h)
LC50 inhalation rat (ppm)	276789.28 ppm/4h
<b>Propane (74-98-6)</b>	
LC50 inhalation rat (mg/l)	658 mg/l/4h
LC50 inhalation rat (ppm)	282800 ppm/4h
<b>Ethane (74-84-0)</b>	
LC50 inhalation rat (mg/l)	658 mg/l/4h
LC50 inhalation rat (ppm)	820000 ppm/4h
ATE US (gases)	820000.000 ppmV/4h
ATE US (vapors)	658.000 mg/l/4h
ATE US (dust, mist)	658.000 mg/l/4h
<b>Methane (74-82-8)</b>	
LC50 inhalation rat (ppm)	820000 ppm/4h
ATE US (gases)	820000.000 ppmV/4h
<b>Hydrogen (1333-74-0)</b>	
LC50 inhalation rat (ppm)	820000 ppm/4h
ATE US (gases)	820000.000 ppmV/4h

Skin corrosion/irritation : Not classified  
Serious eye damage/irritation : Not classified  
Respiratory or skin sensitization : Not classified  
Germ cell mutagenicity : Not classified  
Carcinogenicity : Not classified

Reproductive toxicity : Not classified  
Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

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Aspiration hazard	: Not classified
Symptoms/injuries after inhalation	: May displace oxygen and cause rapid suffocation.
Symptoms/injuries after skin contact	: Adverse effects not expected from this product.
Symptoms/injuries after eye contact	: Adverse effects not expected from this product.
Symptoms/injuries after ingestion	: Ingestion is not considered a potential route of exposure.
Symptoms/injuries upon intravenous administration	: Not known.
Chronic symptoms	: Adverse effects not expected from this product.

## SECTION 12: Ecological information

### 12.1. Toxicity

No additional information available

### 12.2. Persistence and degradability

n-Butane (106-97-8)	
Persistence and degradability	No data available.
Propane (74-98-6)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist.
Ethane (74-84-0)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist.
Methane (74-82-8)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist. No data available.
Hydrogen (1333-74-0)	
Persistence and degradability	No ecological damage caused by this product.

### 12.3. Bioaccumulative potential

n-Butane (106-97-8)	
Log Pow	2.89
Log Kow	Not applicable for gas-mixtures.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.
Propane (74-98-6)	
Log Pow	2.36
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.
Ethane (74-84-0)	
Log Pow	1.81
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.
Methane (74-82-8)	
Log Pow	Not applicable for gas mixtures
Log Kow	Not applicable for gas mixtures
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.
Hydrogen (1333-74-0)	
BCF fish 1	(no bioaccumulation expected)
Log Pow	Not applicable for inorganic gases.
Bioaccumulative potential	No ecological damage caused by this product.

### 12.4. Mobility in soil

n-Butane (106-97-8)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

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Propane (74-98-6)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.
Ethane (74-84-0)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.
Methane (74-82-8)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.
Hydrogen (1333-74-0)	
Ecology - soil	No ecological damage caused by this product.

### 12.5. Other adverse effects

Effect on ozone layer : No known effects from this product.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded. Waste gas should be flared through a suitable burner with flash back arrestor. Do not discharge into areas where there is a risk of forming an explosive mixture with air.

Waste disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at [www.cganet.com](http://www.cganet.com) for more guidance on suitable disposal methods.

## SECTION 14: Transport information

### Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN1954 Compressed gas, flammable, n.o.s., 2.1

UN-No.(DOT) : UN1954

Proper Shipping Name (DOT) : Compressed gas, flammable, n.o.s.

Transport hazard class(es) (DOT) : 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115

Hazard labels (DOT) : 2.1 - Flammable gas



DOT Packaging Non Bulk (49 CFR 173.xxx) : 302;305

DOT Packaging Bulk (49 CFR 173.xxx) : 314;315

DOT Symbols : G - Identifies PSN requiring a technical name

DOT Packaging Exceptions (49 CFR 173.xxx) : 306

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 150 kg

DOT Vessel Stowage Location : D - The material must be stowed "on deck only" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.

DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

Other information : No supplementary information available.

### TDG

Transport document description : UN1954 COMPRESSED GAS, FLAMMABLE, N.O.S., 2.1

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UN-No. (TDG) : UN1954  
TDG Proper Shipping Name : COMPRESSED GAS, FLAMMABLE, N.O.S.  
TDG Primary Hazard Classes : 2.1 - Class 2.1 - Flammable Gas.

### Transport by sea

UN-No. (IMDG) : 1954  
Proper Shipping Name (IMDG) : COMPRESSED GAS, FLAMMABLE, N.O.S.  
Class (IMDG) : 2 - Gases

### Air transport

UN-No. (IATA) : 1954  
Proper Shipping Name (IATA) : COMPRESSED GAS, FLAMMABLE, N.O.S.  
Class (IATA) : 2

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

#### n-Butane (106-97-8)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### Propane (74-98-6)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### Ethane (74-84-0)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### Methane (74-82-8)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

#### Hydrogen (1333-74-0)

Listed on the United States TSCA (Toxic Substances Control Act) inventory

### 15.2. International regulations

#### CANADA

#### n-Butane (106-97-8)

Listed on the Canadian DSL (Domestic Substances List)

WHMIS Classification : Class A - Compressed Gas  
Class B Division 1 - Flammable Gas

#### Propane (74-98-6)

Listed on the Canadian DSL (Domestic Substances List)

WHMIS Classification : Class A - Compressed Gas  
Class B Division 1 - Flammable Gas

#### Ethane (74-84-0)

Listed on the Canadian DSL (Domestic Substances List)

WHMIS Classification : Class A - Compressed Gas  
Class B Division 1 - Flammable Gas

#### Methane (74-82-8)

Listed on the Canadian DSL (Domestic Substances List)

WHMIS Classification : Class A - Compressed Gas  
Class B Division 1 - Flammable Gas

#### Hydrogen (1333-74-0)

Listed on the Canadian DSL (Domestic Substances List)

WHMIS Classification : Class A - Compressed Gas  
Class B Division 1 - Flammable Gas

### EU-Regulations

No additional information available

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### National regulations

#### n-Butane (106-97-8)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on the Canadian IDL (Ingredient Disclosure List)

#### Propane (74-98-6)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

#### Ethane (74-84-0)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

#### Methane (74-82-8)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

#### Hydrogen (1333-74-0)

Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

### 15.3. US State regulations

#### n-Butane (106-97-8)

U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) List

#### Propane (74-98-6)

U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) List

#### Ethane (74-84-0)

U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) List

#### Methane (74-82-8)

U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) List

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### Hydrogen (1333-74-0)

U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) List

## SECTION 16: Other information

- Indication of changes : Revised safety data sheet in accordance with OSHA final rule on GHS implementation promulgated March 26, 2012.
- Other information : This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product.

Full text of H-phrases:

Compressed gas	Gases under pressure Compressed gas
Flam. Gas 1	Flammable gases Category 1
Liquefied gas	Gases under pressure Liquefied gas
H220	Extremely flammable gas
H280	Contains gas under pressure; may explode if heated

SDS US (GHS HazCom 2012)

*This Safety Data Sheet is offered pursuant to OSHA's Hazard Communication Standard, 29 CFR, 1910.1200. Other government regulations must be reviewed for applicability to this product. To the best of Air Liquide America Corporation's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either express or implied, are provided. The information contained herein relates only to this specific product. If this product is combined with other materials, all component properties must be considered. Data may be changed from time to time. Be sure to consult the latest edition.*