ACETYLENE
Material Safety Data Sheet

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	ACETYLENE
Product Code(s)	G-2
UN-Number	UN1001
Recommended Use	Compressed gas.
Synonyms	Ethyne,Acetylen,Ethine, Disolved Acetylene
Supplier Address*	Linde Gas North America LLC - Linde Merchant Production Inc. - Linde LLC 575 Mountain Ave. Murray Hill, NJ 07974 Phone: 908-464-8100 www.lindeus.com Linde Gas Puerto Rico, Inc. Las Palmas Village Road No. 869, Street No. 7 Catano, Puerto Rico 00962 Phone: 787-641-7445 www.pr.lindegas.com Linde Canada Limited 5860 Chedworth Way Mississauga, Ontario L5R 0A2 Phone: 905-501-1700 www.lindecanada.com * May include subsidiaries or affiliate companies / divisions. For additional product information contact your local customer service.
Chemical Emergency Phone Number	Chemtrec: 1-800-424-9300 for US / 703-527-3887 outside US

2. HAZARDS IDENTIFICATION

DANGER!

Emergency Overview

Unstable. Sensitive to heat or shock. May become explosive
Flammable gas
Simple asphyxiant
May cause skin and eye irritation
May cause central nervous system depression
Contents under pressure
Keep at temperatures below 52°C / 125°F

Appearance Colorless | Physical State Compressed gas. | Odor Slight garlic

OSHA Regulatory Status	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Potential Health Effects

Principle Routes of Exposure	Inhalation. Eye contact. Skin contact.
Acute Toxicity	
Inhalation	Simple asphyxiant. May cause suffocation by displacing the oxygen in the air. Exposure to oxygen-deficient atmosphere (<19.5%) may cause dizziness, drowsiness, nausea, vomiting, excess salivation, diminished mental alertness, loss of consciousness and death. Exposure to atmospheres containing 8-10% or less oxygen will bring about unconsciousness without warning and so quickly that the individuals cannot help or protect themselves. Lack of sufficient oxygen may cause serious injury or death. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination.
Eyes	May cause slight irritation.
Skin	May cause skin irritation and / or dermatitis.
Skin Absorption Hazard	No known hazard in contact with skin.
Ingestion	Not an expected route of exposure.
Chronic Effects	None known
Aggravated Medical Conditions	Central nervous system. Respiratory disorders. Skin disorders.
Environmental Hazard	See Section 12 for additional Ecological Information.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	Volume %	Chemical Formula
Acetylene	74-86-2	95	C_2H_2
Acetone	67-64-1	5	C_3H_6O

4. FIRST AID MEASURES

General Advice	Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.
Eye Contact	None normally required. Consult a physician if direct contact with pressurized material occurs. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek immediate medical attention / advice.
Skin Contact	Contaminated clothing presents a fire hazard and should be removed immediately. Wash off immediately with soap and plenty of water. Get medical attention if irritation persists.
Inhalation	PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF INHALATION OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS. Conscious inhalation victims should be assisted to an uncontaminated area and inhale fresh air. If breathing is difficult, administer oxygen. Unconscious persons should be moved to an uncontaminated area and, as necessary, given artificial resuscitation and supplemental oxygen. Treatment should be symptomatic and supportive.
Ingestion	None under normal use. Get medical attention if symptoms occur.
Notes to Physician	Treat symptomatically.

Protection of First-aiders	Remove all sources of ignition.

5. FIRE-FIGHTING MEASURES

Flammable Properties	Flammable.
Suitable Extinguishing Media	Dry chemical. Water spray. DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.
Hazardous Combustion Products	Carbon monoxide. Carbon dioxide (CO_2).
Explosion Data	
Sensitivity to Mechanical Impact	Self-decomposition or self ignition may be triggered by heat, chemical reaction, friction or impact.
Sensitivity to Static Discharge	Yes.
Specific Hazards Arising from the Chemical	GASEOUS ACETYLENE IS SPONTANEOUSLY COMBUSTIBLE IN AIR AT PRESSURES ABOVE 15 PSI (270 kPa). Pure acetylene is shock sensitive. It requires a very low ignition energy so that fires which have been extinguished without stopping the flow of gas can easily re-ignite with possible explosive force. Fires involving acetylene occur occasionally at fusible metal pressure relief plugs at the tops and bottoms of cylinders, commonly due to hot metal or slag dropped on the fusible plugs. When the fusible plug releases a large volume of acetylene creating a "roaring" sound. The flame may extend a foot or two away from the cylinder until the pressure is reduced. In most cases, the other end of the cylinder may develop a coating of frost. If the flame is large, burning from a fusible plug, DO NOT try to put it out unless the cylinder is outdoors or in a very well ventilated area free from sources of ignition. Usually it is very difficult to exinguish large fires because the escaping acetylene may be re-ignited by adjacent ignition sources, thereby possibly creating confined space explosion. Keep containers cool with water spray. Continue to cool fire exposed cylinders until flames are extinguished. Cylinders may rupture under extreme heat. Damaged cylinders should be handled only by specialists.
Protective Equipment and Precautions for Firefighters	Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible withdraw from area and let fire burn. f possible, stop the flow of gas. Do not extinguish the fire until supply is shut off as otherwise an explosive-ignition may occur. If the fire is extinguished and the flow of gas continues, GET AWAY! Vapors may form explosive mixtures with air. Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions	ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Evacuate personnel to safe areas. Keep people away from and upwind of spill / leak. All equipment used when handling the product must be grounded. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Monitor oxygen level. Never enter a confined space or other area where the concentration is greater than 10% of the UEL (0.23%).

Environmental Precautions	Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Prevent spreading of vapors through sewers, ventilation systems and confined areas.
Methods for Containment	Stop the flow of gas or remove cylinder to outdoor location if this can be done without risk. If leak is in container or container valve, contact the appropriate emergency telephone number in Section 1 or call your closest Linde location. DO NOT ATTEMPT TO REMOVE CYLINDERS THAT HAVE BEEN EXPOSED TO HEAT. When the cylinder is removed, it may be hosed down with water to keep it cool. Open valve slowly to let the acetylene escape. Tag the cylinder with "WARNING-Leaking Flammable Gas". Close valve when empty. Contact the appropriate emergency phone number in Section 1or call your closest Linde location.
Methods for Cleaning Up	Return cylinder to Linde or an authorized distributor.

7. HANDLING AND STORAGE

Handling	Ground and bond all lines and equipment associated with product system. All equipment should be non-sparking and explosion proof. Never use copper piping for acetylene service. Only steel or wrought iron pipe should be used. Open cylinder valve minimum amount required (no more than 1-1.5 turns) to deliver acceptable flow to enable the cylinder to be closed quickly in an emergency situation. Acetylene is shipped in a cylinder packed with a porous mass material, and a liquid solvent, commonly acetone. Acetylene is dissolved in the acetone solution and dispersed throughout the porous medium. When the valve of a charged acetylene cylinder is opened, the acetylene comes out of the solution and passes out in the gaseous form. IT IS CRUCIAL THAT FUSE PLUGS IN THE TOPS AND BOTTOMS OF ALL ACETYLENE CYLINDERS BE THOROUGHLY INSPECTED WHENEVER HANDLED. REMOVE AND QUARANTINE IN SAFE LOCATION ANY DEFECTIVE CYLINDER. "NO SMOKING" signs should be posted in storage and use areas. Use only in ventilated areas. Never attempt to lift a cylinder by its valve protection cap. Protect cylinders from physical damage; do not drag, roll, slide or drop. When moving cylinders, even for short distance, use a cart designed to transport cylinders. Use equipment rated for cylinder pressure. Use backflow preventive device in piping. Use an adjustable strap wrench to remove over-tight or rusted caps. Never insert an object (e.g. wrench, screwdriver, pry bar,etc.) into valve cap openings. Doing so may damage valve, causing leak to occur. If user experiences any difficulty operating cylinder valve discontinue use and contact supplier. Never put cylinders into trunks of cars or unventilated areas of passenger vehicles. Never attempt to refill a compressed gas cylinder without the owner's written consent. Never strike an arc on a compressed gas cylinder or make a cylinder a part of an electrical circuit. For additional information, consult the Compressed Gas Association's pamphlets P-1, G-1, G-1.1, AV-9, G-1.2, G-1.3, G-1.5, G-1.6, G-1.7, C-13, SB-4, NFPA #51, and OSHA 1910 Subpart H & Q.

Storage

Unless oxygen and acetylene are separated, there should be a non-combustible partition of at least 5 ft. high with a fire-resistance rating of one-half hour between cylinders. In the U.S. cylinders stored inside a building near user locations must be limited to total capacity of 2500 ft^3 of gas, exclusive of in-use or attached for use cylinders. If rough handling or other occurrences should cause any fusible plug to leak, move the cylinder to an open space well away from an possible source of a sign on the cylinder warning of "Leaking Flammable Gas". Do not store cylinders on their side. This makes the acetylene less stable and less safe, and increases the likelihood of solvent loss resulting in decomposition.

Outside or detached storage is preferred. Protect from physical damage. Cylinders should be stored upright with valve protection cap in place and firmly secured to prevent falling. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Keep at temperatures below 52°C / 125°F. Full and empty cylinders should be segregrated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Always store and handle compressed gas cylinders in accordance with Compressed Gas Association, pamphlet CGA-P1, Safe Handling of Compressed Gases in Containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Acetylene 74-86-2			Ceiling: 2500 ppm Ceiling: 2662 mg / m^3
Acetone 67-64-1	STEL: 750 ppm TWA: 500 ppm	TWA: 1000 ppm TWA: 2400 mg / m^3 (vacated) TWA: 750 ppm (vacated) TWA: 1800 mg / m^3 (vacated) STEL: 2400 mg / m^3 The acetone STEL does not apply to the cellulose acetate fiber industry. It is in effect for all other sectors (vacated) STEL: 1000 ppm	IDLH: 2500 ppm 10% LEL TWA: 250 ppm TWA: 590 mg / m^3

Immediately Dangerous to Life or Health.

Other Exposure Guidelines

Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Engineering Measures

Explosion proof ventilation systems. Local exhaust ventilation to prevent accumulation of high concentrations and maintain air-oxygen levels at or above 19.5%.

Ventilation

Use ventilation adequate to keep exposures below recommended exposure limits.

Personal Protective Equipment

Eye / Face Protection

Wear protective eyewear (safety glasses).

Skin and Body Protection

Work gloves and safety shoes are recommended when handling cylinders. Cotton or Nomex® clothing is recommended to prevent static build-up.

Respiratory Protection

General Use

No special protective equipment required.

Emergency Use

Use positive pressure airline respirator with escape cylinder or self contained breathing apparatus for oxygen-deficient atmospheres (<19.5%).

Hygiene Measures

Wear suitable gloves and eye / face protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Colorless.	Odor	Slight garlic.
Odor Threshold	No information available	Physical State	Compressed gas
Flash Point	No information available.	Autoignition Temperature	296 °C / 565 °F
Decomposition Temperature	No information available.	Boiling Point / Boiling Range	-83.8 °C / -118.8 °F
Freezing Point	-80.6 °C / -113 °F	Molecular Weight	26.04
Water Solubility	Soluble in water	Evaporation Rate	No information available
Vapor Pressure	635 psig @ 70°F / 21.1°C	Vapor Density	0.9 (air = 1)
VOC Content (%)	Not applicable.	Flammability Limits in Air	
		Upper	100%
		Lower	2.3%

10. STABILITY AND REACTIVITY

Stability	Unstable-shock sensitve in the liquid state. Do not allow free gas (outside of cylinder) exceed 15 psig. Do not expose cylinders to sudden shock or heat. Acetylene will decompose violently with cylinder failure. Do not set gas regulators to a discharge pressure above 15 PSIG.
Incompatible Products	Oxidizing agents. Halogens. Copper. Halogenated compounds. Silver. Mercury. Brasses containing >66% copper and brazing materials containing silver or copper.
Conditions to Avoid	Heat, flames and sparks.
Hazardous Decomposition Products	Carbon monoxide (CO). Carbon dioxide (CO_2). Hydrogen gas.
Hazardous Polymerization	Temperatures as low as 250°F (121°C) at high pressure, or at low pressure in the presence of a catalyst are sufficient to initiate a polymerization reaction. The hazard is that the polymerization normally liberates heat and may lead to ignition and decomposition of acetylene if conditions permit.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

LD50 Oral:	No information available.
LD50 Dermal:	No information available.
LC50 Inhalation:	No information available.
Inhalation	High concentrations (10-20% in air) cause symptoms similar to that of being intoxicated. As a narcotic gas or intoxicant, it causes hypercapnia (an excessive amount of carbon dioxide in the blood). Repeated exposures to tolerable levels has not shown deleterious effects. TCLo, human-inhalation of 20 pph inhaled has been shown to cause headaches and dyspnea.
Repeated Dose Toxicity	No information available.

Chronic Toxicity

Chronic Toxicity	None known.
Carcinogenicity	Contains no ingredient listed as a carcinogen.

Irritation	No information available.
Sensitization	No information available.
Reproductive Toxicity	No information available.
Developmental Toxicity	Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.
Synergistic Materials	None known.
Target Organ Effects	Central nervous system (CNS). Respiratory system.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Will not bioconcentrate.

Ozone depletion potential; ODP; (R-11 = 1): Does not contain ozone depleting chemical (40 CFR Part 82).

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Acetone		LC50 96 h: 4.74 - 6.33 mL/L (Oncorhynchus mykiss) LC50 96 h: 6210 - 8120 mg/L static (Pimephales promelas) LC50 96 h: = 8300 mg/L (Lepomis macrochirus)	EC50 = 14500 mg/L 15 min	EC50 48 h: 10294 - 17704 mg/L Static (Daphnia magna) EC50 48 h: 12600 - 12700 mg/L (Daphnia magna)

Chemical Name	Log Pow
Acetylene	0.32
Acetone	-0.24

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods	Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED WITH ANY VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Linde for proper disposal.

14. TRANSPORT INFORMATION

DOT

Proper shipping name	Acetylene, dissolved
Hazard Class	2.1
UN-Number	UN1001
Description	UN1001, Acetylene, dissolved, 2.1
Emergency Response Guide Number	116

TDG

Proper Shipping Name	Acetylene, dissolved
Hazard Class	2.1
UN-Number	UN1001
Description	UN1001, ACETYLENE, DISSOLVED, 2.1

MEX

Proper Shipping Name	Acetylene, dissolved
Hazard Class	2.1
UN-Number	UN1001
Description	UN1001, Acetylene, dissolved,2.1

IATA

UN-Number	UN1001
Proper Shipping Name	Acetylene, dissolved
Hazard Class	2.1
ERG Code	10 L
Description	UN1001,Acetylene, dissolved,2.1
Maximum Quantity for Passenger	Forbidden
Maximum Quantity for Cargo Only	15 kg
Limited Quantity	No information available.

IMDG / IMO

Proper Shipping Name	Acetylene, dissolved
Hazard Class	2.1
UN-Number	UN1001
EmS No.	F-D, S-U
Description	UN1001, Acetylene, dissolved,2.1

ADR

Proper Shipping Name	Acetylene, dissolved
Hazard Class	2.1
UN-Number	UN1001
Classification Code	4F
Description	UN1001, Acetylene, dissolved,2.1

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	Complies
EINECS / ELINCS	Complies

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL / NDSL - Canadian Domestic Substances List / Non-Domestic Substances List
EINECS / ELINCS - European Inventory of Existing Commercial Chemical Substances / EU List of Notified Chemical Substances

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311 / 312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	Yes
Reactive Hazard	Yes

Clean Water Act

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

Risk and Process Safety Management Programs

This material, as supplied, contains one or more regulated substances with specified thresholds under 40 CFR Part 68 or regulated as a highly hazardous chemical pursuant to the 29 CFR Part 1910.110 with specified thresholds:

Chemical Name	U.S. - CAA (Clean Air Act) - Accidental Release Prevention - Toxic Substances	U.S. - CAA (Clean Air Act) - Accidental Release Prevention - Flammable Substances	U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals
Acetylene		10000 lbs	

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following substances which are listed hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act:

Chemical Name	CAS-No	HAPS data	VOC Chemicals	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Acetylene	74-86-2		X		
Acetone	67-64-1		X		

CERCLA / SARA

This material, as supplied, contains one or more substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355):

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	TPQ
Acetone	5000 lb		

U.S. State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Acetylene	X	X	X		X

International Regulations

Chemical Name	Carcinogen Status	Exposure Limits

Acetone		Mexico: TWA= 1000 ppm Mexico: TWA= 2400 mg / m^3 Mexico: STEL= 1260 ppm Mexico: STEL= 3000 mg / m^3

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
A Compressed gases
B1 Flammable gas
F Dangerously reactive material

Prepared By	Product Stewardship 23 British American Blvd. Latham, NY 12110 1-800-572-6501
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NFPA	Health Hazard 1	Flammability 4	Stability 3	Physical and Chemical Hazards -
HMIS	Health Hazard 2	Flammability 4	Physical Hazard 3	Personal Protection -

Note: Ratings were assigned in accordance with Compressed Gas Association (CGA) guidelines as published in CGA Pamphlet P-19-2009, CGA Recommended Hazard Ratings for Compressed Gases, 3rd Edition.

End of Safety Data Sheet