SUPERIOR WELDING SUPPLY CO

ORIGINAL
FORM #18ACETY
REV #8
9/1/09

MATERIAL SAFETY DATA SHEET

Printing date 06/02/2009 Revision date 06/02/2009

1 Identification of Substance

Product Details

Trade Name: Acetylene

Product No: G-2

Manufacturer/Supplier:

Linde
575 Mountain Avenue
Murray Hill, NJ 07974 USA
ph: 908-464-8100

Linde Gas Puerto Rico, Inc.
Las Palmas Village
Road No. 869, Street No. 7
Catano, Puerto Rico 00962
ph: 787-754-7445

Linde Canada Limited
5860 Chedworth Way
Mississauga, Ontario L5R 0A2
ph: 905-501-1700

Information Department:
Linde U.S. National Operations Center: 1-800-232-4726 (for US and Puerto Rico assistance)

Emergency Information:
For U.S & Puerto Rico, CHEMTREC 24-HOUR EMERGENCY TELEPHONE NUMBER: 800-424-9300
For Canada, 24-HOUR EMERGENCY TELEPHONE NUMBER: 905-501-0802

2 Hazards Identification

Hazard Description:
Flammable colorless gas with slight garlic odor. Dangerous fire and explosion hazard. Highly flammable under pressure. Spontaneously combustible in air at pressures above 15 psig. Acetylene liquid is shock sensitive. Avoid heat, sparks and flame. Simple asphyxiant. Maintain oxygen levels above 19.5%. Contents under pressure. Use and store under 125°F.

Emergency Overview:
This product does not contain oxygen and may cause asphyxia if released in a confined area. May cause anesthetic effects.

CLASSIFICATION SYSTEM:

NFPA Ratings (scale 0 - 4)

Health = 0
Fire = 4
Instability = 2
Special = SA

HMIS Ratings (scale 0 - 4)

Health = 2
Fire = 4
Physical Hazard = 2

3 Composition/Data on Components

CAS No. Description
74-86-2 Acetylene 95.0 - 99.6%
67-64-1 Acetone ≤ 5.0% (estimate)

4 First aid measures

After Inhalation:
PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE AWARE OF EXTREME FIRE AND EXPLOSION HAZARD.

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Conscious inhalation victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is essential. If breathing is difficult, administer oxygen. Unconscious persons should be moved to an uncontaminated area and given mouth-to-mouth resuscitation and supplemental oxygen. Obtain immediate medical attention. Treatment should be symptomatic and supportive.

After skin contact:
Contaminated clothing presents a fire hazard and should be immediately removed. Wash affected areas with soap and warm water. If irritation develops, seek medical attention.

After eye contact:
None normally required. Consult a physician if direct contact with pressurized material occurs. Flush with low pressure, cool water for at least fifteen minutes, opening eyelids to ensure sufficient flushing. Obtain medical attention.

After ingestion: None expected, as acetylene is a gas at room temperature.

5 Fire fighting measures

Flammable Properties:
Highly flammable gas. PURE ACETYLENE IS SPONTANEOUSLY COMBUSTIBLE IN AIR AT PRESSURE ABOVE 15 PSI (207kPa). It requires a very low ignition energy, so that fires which have been extinguished without stopping the flow of gas can easily reignite with possible explosive force. Acetylene has a density very similar to that of air, and therefore does not dissipate readily. The gas may travel to a source of ignition and flash back. Cylinder may vent rapidly or rupture violently when involved in a fire situation. Heating the cylinder until pressure relief device is activated will expel gas and intensify or cause a fire.

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 being dropped on the plugs. When the fusible plug releases, a large volume of acetylene will rush out, creating a "roaring" sound. The flame may extend one or two feet from the cylinder until the pressure is released. In some cases, the other end of the cylinder may develop a coating of frost.

Suitable extinguishing agents: Carbon dioxide or dry chemical.

Special hazards caused by the material, its products of combustion or resulting gases:
Fire will produce carbon monoxide and carbon dioxide.

Protective equipment:
Firefighters should wear approved NIOSH/MSHA full facepiece self-contained breathing apparatus (SCBA) and full turnout or Bunker gear.

Fire Fighting Instructions:
WARNING: ALWAYS EXTINGUISH AN ACETYLENE FIRE BEFORE CLOSING THE CYLINDER VALVE! If the flame from the fusible plug or valve stem is small, try to put it out. Use non-sparking tools to close container valves. If the fire is allowed to keep burning, it is likely that the fusible plug will melt and result in a large release of acetylene. A glove, heavy cloth or any wet material slapped on the flame will frequently extinguish it.

If there is a large flame 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 extinguish large acetylene fires because the escaping acetylene may be reignited by adjacent ignition sources, thereby possibly creating a confined space explosion.

Use water spray to cool surrounding containers. Be cautious of a Boiling Liquid Evaporating Vapor Explosion, BLEVE, if flame is impinging on surrounding containers. Direct 500 GPM water stream onto containers above liquid level with remote monitors. Limit number of personnel in proximity of fire and evacuate surrounding areas in all directions. Continue to cool fire-exposed cylinders until well after

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flames are extinguished.

6 Accidental release measures

Person-related safety precautions:
Immediately evacuate all personnel from affected area and extinguish all ignition sources. Stop the flow of gas using a valve in a remote location if possible. No smoking, sparks, flames or flares in hazard area. Increase ventilation to prevent buildup of flammable/explosive atmosphere. Use appropriate protective equipment (see Section 8). Deny entry to unauthorized and unprotected personnel. Stop or control leak or remove cylinder to outdoor location if it can be done without risk. Use water spray to cool and absorb vapors and protect personnel. Consult a HAZMAT specialist and the appropriate emergency telephone number in Section 1 or your closest Linde location.

Immediately extinguish all ignition sources. There should be no smoking, flames, fires or sparks in hazard area. Evacuate all personnel from affected areas and provide maximum explosion-proof ventilation. Never enter a confined space or other area where the acetylene concentration is greater than 10% of the LEL (0.23%). In the event of leakage of a tank, rail car or tank truck, isolate the area for over ½ mile in all directions.

If possible to do so, shut off all ignition sources and stop the leak by closing the valve. For small leaks, cylinders may be moved to an area outdoors and away from any ignition sources. It is advisable to attempt removal of the cylinder are (1) when cylinders are in close proximity to other compressed gases, (2) when highly flammable materials or hazardous materials are in the vicinity of the acetylene cylinder(s), or (3) where protection of of the building is unusually difficult and a spreading fire may product a major loss of life or property. DO NOT ATTEMPT TO MOVE CYLINDERS THAT HAVE BEEN EXPOSED TO HEAT. When the cylinder is removed, it may be hosed down with water to keep it cool. Open the valve slowly to let the acetylene escape. Tag the cylinder with "WARNING - Leaking Flammable Gas". Close the valve when empty.

Measures for environmental protection: Inform authorities in case of gas release.

Measures for cleaning/collecting: Ensure adequate ventilation.

7 Handling and storage

HANDLING:
Information about protection against explosions and fires:
All acetylene piped systems and associated equipment must be grounded. Never use copper piping for acetylene service. Only steel or wrought iron should be used.

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 solution and passes out of the cylinder in gaseous form. Post "NO SMOKING OR OPEN FLAMES" signs in areas where acetylene is stored or used. There should be no source for accidental ignition. Never use an open flame to leak check a cylinder.

STORAGE:
Unless oxygen and acetylene are separated, there should be a non-combustible partition between the cylinders of at least 5-feet high with a fire resistance rating of one-half hour. In the U.S., cylinders stored inside a building near use locations must be limited to a total capacity of 2500 ft³ of gas, exclusive of in-use or attached-for-use cylinders.
Requirements to be met by storerooms and receptacles:
Protect cylinders from physical damage. Store in cool, dry, well-ventilated area away from heavily trafficked areas and emergency exits. Outside or detached storage is preferred. DO NOT allow the temperature where cylinders are stored to exceed 125°F (52°C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. DO NOT store cylinders on their sides. This makes the acetylene less stable and less safe, and increases the likelihood of solvent loss and resultant decomposition. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders from being stored for excessive periods of time.

Valve protection caps must remain in place unless container is secured with valve outlet piping to use point. Close valve after each use and when cylinder is empty. Do not drag, slide or roll cylinders on their sides. Use a suitable hand truck for container movement. Use a pressure reducing regulator when connecting the container to piping or systems. Do not use gas directly from the cylinder. Do not heat container by any means to increase the discharge rate of product from the container. Never insert an object (i.e., screwdriver, etc) into valve cap openings as this can damage the valve, causing leakage.

Specific applications:
Open cylinder valve the minimum amount required - no more than 1 -1.5 turns - to deliver acceptable flow. This will enable closing the cylinder quickly in an emergency situation. IT IS CRUCIAL THAT FUSE PLUGS IN THE TOPS AND BOTTOMS OF ALL ACETYLENE CYLINDERS BE THOROUGHLY INSPECTED WHENEVER HANDLED. REMOVE AND QUARANTINE IN A SAFE LOCATION ANY DEFECTIVE CYLINDER.

Never attempt to repair or alter cylinders. Never tamper with pressure relief devices or fusible plugs. Under no circumstances allow a torch flame to contact the fusible plug. While welding, avoid contact of the cylinder with welding equipment or electrical circuits.

If rough handling or other occurrences should cause any fusible plug to leak, move the cylinder to an open space well away from any possible sources of ignition. Place a sign on the cylinder warning of "Leaking Flammable Gas".

For additional information, consult the Compressed Gas Association (CGA) publications P-1, G-1, G-1.1, G-1.2, G-1.3, G-1.5, G-1.6, G-1.7, AV-9 and SB-4. Also consult NFPA Publication 51, and OSHA 1910 Subparts H and Q.

Security:
Store container in a secured area. Limit access to authorized personnel only. Report any incidents involving thefts, misuse, or inventory shortages (missing containers or cylinders) to law enforcement and the supplier. Security shall be provided in accordance with all local, state (provincial) and federal regulations.

8 Exposure controls and personal protection

Engineering Controls:
Use local exhaust and general ventilation systems to prevent accumulation of flammable concentrations. Small quantities can be handled in forced ventilation hoods. If product is handled routinely where the potential for leaks exists, all electrical equipment must be rated for use in potentially flammable atmospheres. Consult the National Electrical Code for details.

Components with limit values that require monitoring at the workplace:	
74-86-2 acetylene	
REL	Short-term value: C 2662 mg/m³, C 2500 ppm
TLV	Simple asphyxiant
67-64-1 acetone (≤ 5.0%)	
PEL	2400 mg/m³, 1000 ppm
REL	590 mg/m³, 250 ppm
TLV	500 ppm TWA, 750 ppm STEL

PERSONAL PROTECTIVE EQUIPMENT:

Breathing equipment:
Positive pressure NIOSH-approved air-supplying respirator system (SCBA or airline/escape bottle) with a full-face mask and at a minimum of Grade D air should be available for emergency use.

Hand/skin protection:
Protective gloves and clothing as necessary for the job. Gloves with thermal protection should be used for welding.

Eye/face protection: Safety goggles or glasses as appropriate for the job.

Other/General Protection: Safety shoes. Cotton clothing is recommended to prevent static build-up.

9 Physical and chemical properties

GENERAL INFORMATION:	
Form:	Gas
Color:	Colorless
Odor:	Pure acetylene has a faint ethereal odor; Commercial (carbide) acetylene has a distinctive garlic-like odor.

CHANGE IN CONDITION:	
Melting point/Melting range:	-80.8°C (-113°F)
Boiling point/Boiling range:	-83.6°C (-118°F)
Flash point:	Not applicable
Ignition temperature:	325°C (617°F)
Danger of explosion:	Heating may cause an explosion. Explosive with or without contact with air.
Explosion limits:	
Lower:	2.3 Vol %
Upper:	78 Vol %
Vapor pressure at 20°C (68°F):	0.043 hPa
Density at 20°C (68°F):	0.00117 g/cm³
Solubility in / Miscibility with Water at 20°C (68°F):	1.185 g/l

10 Stability and reactivity

Thermal decomposition / Conditions to be avoided:
Unstable - shock sensitive in the liquid state. Do not allow free gas (i.e., outside the cylinder) to exceed 15 psig. Do not expose cylinders to sudden shock or heat. Acetylene will decompose violently with cylinder failure. Keep away from heat, sparks, flames, and other ignition sources.

Materials to be avoided:
Oxygen and other oxidizers including all halogens and halogen compounds. Forms explosive acetylide compounds with copper, mercury, silver, brasses containing >66% copper, and brazing materials containing silver or copper. The use of acetylene and these metals, or their salts, compounds and high concentration alloys should be avoided. Moisture, certain acids and alkaline materials may enhance the formation of copper acetylides.

Dangerous reactions:
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 polymerization normally liberates heat and may lead to ignition and decomposition of acetylene if conditions permit.

Dangerous products of decomposition:
Acetylene decomposes at high pressure to its constituent elements of carbon and hydrogen. Carbon monoxide and carbon dioxide may be produced from burning.

11 Toxicological information

ACUTE TOXICITY
Toxicological Overview:
Acetylene is a simple asphyxiant. High concentrations may exclude an adequate supply of oxygen to the lungs. Effects of oxygen deficiency resulting from simple asphyxiation may include rapid breathing, diminished mental alertness, impared muscular coordination, faulty judgement, depression of sensations, emotional instabiity and fatigue. As asphyxiation progresses, nausea, vomiting, prostration and loss of consciousness may result, eventually leading to convulsions, coma and death.
PRIMARY IRRITANT EFFECT:

On the skin/eye: Adverse effects are not expected. Repeated contact may cause serious irritation.

On inhalation:
High concentrations (10-20%) in air cause symptoms similar to that of intoxication. 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. Inhalation of 20 pph inhaled by humans has been shown to cause headaches and dyspnea.

Other information (about experimental toxicology):
Oxygen deficiency during pregnancy has produced developmental abnormalities in humans and experimental animals.

12 Ecological information

Environmental impact:
Not classified as a Class I or Class II ozone depleting substance. Not toxic. Will not bioaccumulate.

13 Disposal considerations

PRODUCT:
Recommendation:
Do not attempt to dispose of residual waste or unused quantities. Return in the shipping container PROPERLY LABELED, WITH ALL VALVE OUTLET PLUGS OR CAPS SECURED AND VALVE PROTECTION CAP IN PLACE to Linde or authorized distributor for proper disposal.

UNCLEANED PACKAGING:
Recommendation: Same as above.

14 Transport information

DOT regulations:

Hazard class:	2
Identification number:	UN1001
Packing group:	-
Proper shipping name (technical name):	ACETYLENE, DISSOLVED
Label	2.1

Land transport ADR/RID (cross-border):

ADR/RID class:	2 4F Gases
Danger code (Kemler):	239
UN-Number:	1001
Packaging group:	-
Label:	2.1
Description of goods:	1001 ACETYLENE, DISSOLVED

Maritime transport IMDG:

IMDG Class:	2.1
UN Number:	1001
Label	2.1
Packaging group:	-
EMS Number:	F-D,S-U
Proper shipping name:	ACETYLENE, DISSOLVED

Air transport ICAO-TI and IATA-DGR:

ICAO/IATA Class:	2
UN/ID Number:	1001
Label	2.1
Packaging group:	-
Proper shipping name:	ACETYLENE, DISSOLVED

15 Regulations

SARA
Section 355 (extremely hazardous substances): Substance is not listed.
Section 313 (Specific toxic chemical listings): Substance is not listed.

TSCA (Toxic Substance Control Act):
The substances below are listed:

74-86-2	acetylene
67-64-1	acetone

PROPOSITION 65:
Chemicals known to cause cancer: Substance is not listed.
Chemicals known to cause reproductive toxicity for females: Substance is not listed.
Chemicals known to cause reproductive toxicity for males: Substance is not listed.
Chemicals known to cause developmental toxicity: Substance is not listed.

CARCINOGENICITY CATEGORIES:
EPA (Environmental Protection Agency) Substance is not listed.
IARC (International Agency for Research on Cancer) Substance is not listed.
NTP (National Toxicology Program) Substance is not listed.
TLV (Threshold Limit Value established by ACGIH) Substance is not listed.
NIOSH (National Institute for Occupational Safety and Health) Substance is not listed.
OSHA (Occupational Safety & Health Administration) Substance is not listed.

Product related hazard informations:

Risk phrases:
5 Heating may cause an explosion.
6 Explosive with or without contact with air.
12 Extremely flammable.

Safety phrases:
2 Keep out of the reach of children.
9 Keep container in a well-ventilated place.
16 Keep away from sources of ignition - No smoking.
33 Take precautionary measures against static discharges.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Department Issuing MSDS: Linde Safety, Health, Environment and Quality
Contact: Refer to Linde web site for contact and product information at www.lindeus.com.

Sources:
ABBREVIATIONS AND ACRONYMS:

ADR/RID: Agreement on Dangerous Goods by Road/Regulation concerning the International Transport of Goods by Rail
CAS: Chemical Abstracts Service
DOT: US Department of Transportation
EINECS: European Inventory of Existing Chemical Substances
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
HMIS: Health Management Information System
IATA: International Air Transport Organization
IATA-DGR: Dangerous Goods Regulations by the International Air Transport Organization
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the International Civil Aviation Organization
IMDG: International Marine Code for Dangerous Goods
NFPA: National Fire Protection Association
OSHA: U.S. Occupational Safety and Health Administration