

AGA Gas, Inc.
3300 Lakeside Avenue
Cleveland, Ohio 44114

Telephone
(216) 696-2400

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| PRODUCT NAME Acetylene | CAS # 74-86-2 |
| TRADE NAME AND SYNONYMS Acetylene, Ethyne | DOT I.D. No: UN 1001 |
| CHEMICAL NAME AND SYNONYMS Acetylene | DOT Hazard Class: Flammable gas |
| ISSUE DATE AND REVISIONS 25 November 1985 | Formula: C ₂ H ₂ |
| | Chemical Family: Alkyne |

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT Acetylene is defined as a simple asphyxiant. Oxygen levels should be maintained at greater than 18 molar percent at normal atmospheric pressure which is equivalent to a partial pressure of 135 mm Hg. (ACGIH, 1985-86)

SYMPTOMS OF EXPOSURE

Inhalation: Low concentrations (10-20% in air) cause symptoms similar to that of being intoxicated. Higher concentrations so as to exclude an adequate supply of oxygen to the lungs cause unconsciousness.

TOXICOLOGICAL PROPERTIES

As a narcotic gas or intoxicant causes hypercapnia (an excessive amount of carbon dioxide in the blood). Repeated exposures to tolerable levels has not shown deleterious effects. The major property is the exclusion of an adequate supply of oxygen to the lungs.

RECOMMENDED FIRST AID TREATMENT

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO ACETYLENE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD.

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given mouth-to-mouth resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

Information contained in this material safety data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable; but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use.

Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Flammable over an extremely wide range in air. Explosive reactions may occur on ignition. Reacts explosively with halogens and halogenated compounds.

PHYSICAL DATA

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| BOILING POINT Sublimation point = -118.8°F (-83.8°C) | LIQUID DENSITY AT BOILING POINT @ -116°F (-82°C) = 38.8 lb/ft ³ (622 kg/m ³) |
| VAPOR PRESSURE @ 70°F (21.1°C): 645 psia (4450 kPa) | GAS DENSITY AT 70°F, 1 atm .0691 lb/ft ³ (1.107 kg/m ³) |
| SOLUBILITY IN WATER Soluble | FREEZING POINT -113°F (-80.6°C) |
| EVAPORATION RATE N/A | SPECIFIC GRAVITY (AIR=1) @ 68°F (20°C) = 0.906 |
| APPEARANCE AND ODOR Pure acetylene is a colorless gas with an ethereal odor. Commercial (carbide) acetylene has a distinctive garlic-like odor. | |

FIRE AND EXPLOSION HAZARD DATA

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| FLASH POINT (Method used) Gas | AUTO IGNITION TEMPERATURE 565°F (296°C) | FLAMMABLE LIMITS % BY VOLUME See last page LEL 2.2 UEL 80-85 |
| EXTINGUISHING MEDIA Carbon dioxide; dry chemical | ELECTRICAL CLASSIFICATION Class 1, Group A | |
| SPECIAL FIRE FIGHTING PROCEDURES If possible, stop flow of escaping gas. Use water spray to cool surrounding containers. Keep personnel away since heated or burning cylinders can rupture violently. | | |
| UNUSUAL FIRE AND EXPLOSION HAZARDS GASEOUS ACETYLENE IS SPONTANEOUSLY COMBUSTIBLE IN AIR AT PRESSURES ABOVE 30 PSIA (207 kPa). 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. (Continued on last page.) | | |

REACTIVITY DATA

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| STABILITY Unstable | X | CONDITIONS TO AVOID Do not allow the free gas (outside of cylinder) to exceed 30 psia. Cylinders should not be exposed to sudden shock or sources of heat. |
| Stable | | |
| INCOMPATIBILITY (Materials to avoid) Oxygen and other oxidizers including all of the halogens and halogen compounds. (Continued on last page.) | | |
| HAZARDOUS DECOMPOSITION PRODUCTS Carbon and hydrogen | | |
| HAZARDOUS POLYMERIZATION May Occur | | CONDITIONS TO AVOID |
| Will Not Occur | X | N/A |

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.

WASTE DISPOSAL METHOD Do not attempt to dispose of 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 your supplier. For emergency disposal assistance, contact your closest supplier location or call emergency telephone number listed herein.

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| RESPIRATORY PROTECTION (Specify type) Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use. | | |
| VENTILATION Hood with forced ventilation. | LOCAL EXHAUST To prevent accumulation above the LEL. | SPECIAL N/A |
| | MECHANICAL (Gen.) In accordance with electrical codes. | OTHER N/A |
| PROTECTIVE GLOVES PVC or rubber in laboratory; as required for cutting and welding. | | |
| EYE PROTECTION Safety goggles or glasses | | |
| OTHER PROTECTIVE EQUIPMENT Safety shoes, safety shower | | |

SPECIAL PRECAUTIONS*

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| SPECIAL LABELING INFORMATION | |
| DOT Shipping Name: Acetylene | DOT Hazard Class: Flammable gas |
| DOT Shipping Label: Flammable gas | I.D. No.: UN 1001 |
| SPECIAL HANDLING RECOMMENDATIONS | |
| Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when removing gas from the cylinder. DO NOT ALLOW THE FREE GAS TO EXCEED 30 PSIA (207 kPa) @ 70°F (21.1°C). Do not heat cylinder by any means to increase the discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder. | |
| For additional recommendations, consult Compressed Gas Association's Pamphlets G-1, P-1, P-14 and Safety Bulletin SB-2. | |
| SPECIAL STORAGE RECOMMENDATIONS | |
| Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of non-combustible construction away from heavily trafficked areas and emergency exits. Do not allow the temperature where cylinders are stored to exceed 130F (54C). Cylinders must be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in-first out" inventory system to prevent full cylinders being stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area. | |
| For additional recommendations, consult Compressed Gas Association's Pamphlets G-1, P-1, P-14, and Safety Bulletin SB-2. | |
| SPECIAL PACKAGING RECOMMENDATIONS Since acetylene will explode or combust if its pressure exceeds 30 psia (207 kPa) it is shipped dissolved in acetone or dimethylformamide which is dispersed in a porous mass within the cylinder. Follow your supplier's instructions for the maximum withdrawal rate for each size cylinder so that solvent is not withdrawn with the acetylene. | |
| Most metals except silver, copper, mercury or brasses with more than 66% copper are compatible (non corrosive) with acetylene. | |
| OTHER RECOMMENDATIONS OR PRECAUTIONS | |
| Earth-ground and bond all lines and equipment associated with the acetylene system. Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of Federal Law (49CFR). | |

*Various Government agencies (i.e., Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of the product which will not be reflected in this

FIRE AND EXPLOSION HAZARD DATA (Continued)

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UEL: (Continued)

Pure acetylene can ignite by decomposition above 30 psia (207 kPa); therefore, the UEL is 100% if the ignition source is of sufficient intensity.

FIRE AND EXPLOSION HAZARD DATA (Continued)

UNUSUAL FIRE AND EXPLOSION HAZARDS: (Continued)

Acetylene has a density very similar to that of air so when leaking it does not readily dissipate.

REACTIVITY DATA (Continued)

INCOMPATIBILITY: (Continued)

Forms explosive acetylide compounds with copper, mercury, silver, brasses containing more than 66% copper and brazing materials containing silver or copper.

FIRE AND EXPLOSION HAZARD DATA (Continued)

FLAMMABLE LIMITS % BY VOLUME: (Continued)

Pure acetylene can ignite by decomposition above 30 psia (207 kPa); therefore, the UEL is 100% if the ignition source is of sufficient intensity.