

MATERIAL SAFETY DATA SHEET (MSDS)

ACETYLENE

Please ensure that this MSDS is received by the appropriate person

DATE: May 2008

Version 1

1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT IDENTIFICATION

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|------------------|--|
| Product Name | ACETYLENE |
| Chemical Formula | C ₂ H ₂ |
| Trade Names | Acetylene Dissolved Acetylene - DA PortaPak Acetylene EconoPak Acetylene Agrigas Acetylene Instrument Grade Acetylene |
| Colour Coding | Acetylene cylinders have maroon (A01) bodies. Acetylene cylinders may have different valve guard colours depending on gas grade – Green, Orange, Blue. Some grades have the grade stencilled along the body in white letters. Decals attached to the cylinders also provide information on grade. |
| Valve | All large acetylene cylinders have a brass cylinder valve with a 5/8 inch BSP female left hand outlet thread. Only the small PortaPak acetylene cylinder has an 11/16 inch left hand female thread. |

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|-------------------------------|---|
| COMPANY IDENTIFICATION | African Oxygen Limited 23 Webber Street Johannesburg, 2001 Tel. No: (011) 490-0400 Fax No: (011) 490-0506 |
| EMERGENCY No.: | 0800 147 112 (HAZMAT) |

2 COMPOSITION/INFORMATION ON INGREDIENTS

| | |
|-----------------|--------------------------|
| Chemical Name | Acetylene |
| Chemical Family | Unsaturated Hydrocarbons |
| Synonyms | Dissolved Acetylene (DA) |
| CAS No. | 74-86-2 |
| UN No. | 1001 |
| ERG No. | 116 |
| Hazchem Warning | 2a Flammable Gas |

3 HAZARDS IDENTIFICATION

MAIN HAZARD: Acetylene is extremely flammable, and slightly lighter than air. Acetylene is very easy to ignite and burns with an extremely hot bright flame giving off black smoke. Flammability limits in air are 2,5% to 82% by volume. Highly explosive mixtures can be formed in air in this range. Acetylene is dissolved in acetone under pressure in steel cylinders. Cylinders are filled with a porous substance to distribute the acetone throughout the cylinder volume. Cylinders are portable gas containers, and must be regarded as pressure vessels at all times. Cylinders must never be exposed to excessive heat as this may cause rupturing of the cylinder and explosive release of the gas.

Adverse health effects. Acetylene gas is simple asphyxiant. High concentrations may cause narcosis. A 20% concentration may cause dyspnea and headaches. A 40% concentration or more may cause collapse.

Chemical Hazards. Never use free Acetylene at pressures above 150 kPa as the gas may decompose with explosive force under certain conditions. Acetylene may form readily explosive acetylides compounds when in contact with copper, silver or mercury. Acetylene should not be used with these metals, their salts, compounds or high concentration alloys.

Environmental Impact Acetylene is a volatile organic compound (VOC) which leads to the formation of photochemical oxidants and predicted warming of the atmosphere.

Vapour Inhalation. Acetylene is a simple asphyxiant, high concentrations may cause narcosis.

| | |
|---------------------|-----------------|
| Eye Contact | No known effect |
| Skin Contact | No known effect |
| Ingestion | No known effect |

4 FIRST AID MEASURES

As the gas is a simple asphyxiant, keep the patient warm and immediately administer oxygen. Apply artificial respiration only if the patient is not breathing, but do NOT use mouth-to-mouth resuscitation. Persons who have inhaled the fumes produced in a fire, or chemical reaction, may not show immediate symptoms. They must lie down and keep still, and be taken for medical attention. The patient should be kept under medical observation for at least 48 hours. Treatment should be symptomatic and supportive.

5 FIRE FIGHTING MEASURES

Extinguishing media. Dry powder. Fog-water spray. In the absence of fog equipment a fine spray of water may be used.

Specific hazards. Highly flammable. Temperatures in a fire may cause the activation of the pressure-relief devices, and/or the unpredictable violent rupture of the cylinder, which will add a large quantity of fuel to the fire. Cylinders must be kept cool with large quantities of water. An unignited gas cloud will form a highly flammable or explosive mixture in air, and all sources of ignition must be eliminated. A gas cloud may also be a simple asphyxiant.

Emergency actions.

Acetylene leak – leak not ignited – cylinder not hot. Eliminate all sources of ignition in the area. Close the cylinder valve. If necessary tighten the gland nut. If leak continues, evacuate the area, and avoiding sources of ignition and minimising personal risk move the leaking cylinder to a safe well ventilated outside area. Post warning notices and prevent access to the area. Do not attempt to tighten the cylinder valve in the body of the cylinder. Do not tamper with the safety devices.

Hot Cylinder or Acetylene leak ignited. Raise fire alarm. Close cylinder valve if safe to do so, and use relevant extinguisher. If not possible, allow small fires to remain burning if they are not posing a hazard or impinging on cylinders. This will prevent the pressure from building up in the cylinder. **Call fire brigade.** Remove all cylinders from the path of the fire. Cool cylinders exposed to the fire by applying large amounts of water from a safe location. Evacuate the area. Do **NOT** attempt to move cylinders involved in a fire until they have been cold for at least one (1) hour. Check by stopping the cooling water and noting whether the cylinders surfaces dry rapidly or generate steam. Continue the cooling until the cylinder surfaces remain wet without any dry patches forming quickly. Check with a bare hand that cylinders remain cool for at least one (1) hour. Should any cylinders be found to be warm, reapply cooling water, and check as before. Once all the effected cylinders have remained cool for at one (1) hour, immerse in a cold water-bath for a further twelve (12) hours. This will prevent the spontaneous re-ignition.

Protective clothing. Exposed fire fighters should wear approved self-contained breathing apparatus with full-face masks.

Environmental precautions. As acetylene gas is lighter than air, ensure that it is not trapped in confined spaces. This may lead to formation of highly explosive acetylene air mixture. Ventilate all confined spaces using forced-draught if necessary. Ensure that all electrically powered equipment is flameproof.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions. As Acetylene is a simple asphyxiant, care should be taken when entering confined spaces where leaks may have occurred. DO NOT enter any potentially hazardous area with any source of ignition such as a lit cigarette, non-flameproof torch or cell phone.

Small spills. Small leaks should be extinguished by shutting off the source of supply, e.g. closing the valve on the cylinder, or tightening the gland nut where appropriate. If unable to stop small leaks, the cylinder should be moved to a well ventilated open area well away from any source of ignition. Should a small leak have ignited, use a multi-purpose dry powder extinguisher. Should there be no extinguisher available, a welder's glove or heavy cloth, soaked in water may be used to extinguish the flame.

Large spills. Stop the source of gas release if it can be done safely. Eliminate all sources of ignition and static discharge in the area. Maximise ventilation using forced draught if necessary. Restrict access to the area until completion of the clean-up procedure. Post relevant warning signs. Wear adequate protective clothing when working near the source of the leak. Ensure that all equipment is flameproof.

7 HANDLING AND STORAGE

Cylinders should always be transported in the upright position, with the valve uppermost, and be firmly secured. Do NOT store Acetylene and Oxygen cylinders in close proximity to each other. Storage in the same room or space is prohibited with following classes: Explosives; Oxidising Agents; Radioactive Agents; Organic Peroxides; Spontaneously Combustible Material. Cylinders must not be stored or used near sources of heat or ignition. Conspicuous signs should be posted in the storage area forbidding smoking, or the use of naked lights. Use the "first in - first out" inventory system to prevent full cylinders from being stored for excessive periods of time. Compliance with all relevant legislation is essential. Keep away from children. If a cylinder has been stored horizontally, stand it upright for at least 30 minutes before use to prevent acetone carryover.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Hazards. No known effect.

Engineering Control Measures. Engineering control measures are preferred to reduce exposures. General methods include mechanical ventilation, process or personal enclosure, control of process conditions and use of flameproof equipment. Administrative controls and personal protective equipment may also be required. Use a suitable flameproof ventilation system separate from other exhaust ventilation systems. When exhausting to outside supply sufficient replacement air to make up for air removed by exhaust system.

Personal protection. Use self-contained breathing apparatus when fighting large fires.

Eyes Use safety glasses when working with cylinders.

Hands Use suitable protective gloves when working with cylinders.

Feet Wear protective footwear when working with cylinders.

Skin No known effect.

9 PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL DATA

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| Chemical Symbol | C ₂ H ₂ |
| Molecular Weight | 26,038 |
| Specific Volume @ 20°C & 101,325 kPa | 918,0 ml/g |
| Density, gas @ 101,325 kPa and 20°C | 1,0904 kg/m ³ |
| Auto ignition temperature | 305°C |
| Relative density (Air=1) @ 101,325 kPa | 0,906 |
| Flammability limits in air (by volume) | 2,5 - 82% |
| Colour | None |
| Taste | None |
| Odour | Ethereal when pure. Garlic when commercial |

10 STABILITY AND REACTIVITY

Conditions to avoid. Overheating of cylinders. Never, under any circumstances, attempt the transfer of Acetylene from one cylinder to another, or try to refill cylinders, or mix any other gas with Acetylene in a cylinder. Never tamper with pressure relief devices in valves or cylinders. Keep sparks, flames or any ignition source away from cylinders. Under no circumstances allow a torch flame to come into contact with any part of the cylinder. Never test for leaks with a flame. Use soapy water when testing for leaks. Never use Acetylene cylinders in a horizontal or inverted position. Never allow hard mechanical impact on a cylinder or drop a cylinder. Never use cylinders as rollers or supports, or for any purposes other than the storing of Acetylene.

Incompatible materials. See section on chemical hazards.

Hazardous decomposition products. Acetylene in its free state under pressure may decompose violently. The higher the pressure, the smaller the energy needed to cause an explosion. Never use free gas outside of the cylinder at pressures exceeding 150kPa. Should the cylinder contents be burning internally, as indicated by a hot cylinder surface, this could lead to a build-up of pressure, resulting in the cylinder exploding. Treat as for Hot Cylinder in Section 5 FIRE FIGHTING MEASURES. NOTIFY THE NEAREST AFROX BRANCH.

11 TOXICOLOGICAL INFORMATION

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|----------------------|-----------------|
| Acute Toxicity | No known effect |
| Skin & eye contact | No known effect |
| Chronic Toxicity | TLV 750 VPM |
| Carcinogenicity | No known effect |
| Mutagenicity | No known effect |
| Reproductive Hazards | No known effect |

12 ECOLOGICAL INFORMATION

As Acetylene is lighter than air it will disperse rapidly in open areas. It does not pose a hazard to the ecology.

13 DISPOSAL CONSIDERATIONS

Disposal Methods. Small amounts of acetylene may be blown to the atmosphere under controlled conditions. No sources of ignition should be in the vicinity. Large amounts of gas should only be handled by the gas supplier.

Disposal of packaging. Disposal and processing of cylinders must only be handled by the gas supplier.

14 TRANSPORT INFORMATION

ROAD TRANSPORTATION

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|-----------------|------------|
| UN No. | 1001 |
| Class | 2.1 |
| Danger Group | Flammable |
| Subsidiary Risk | Asphyxiant |
| ERG No. | 116 |
| Hazchem Warning | 2A |

SEA TRANSPORTATION

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|-----------------------|---------------|
| IMDG | 1001 |
| Class | 2.1 |
| Packaging Group/Label | Flammable Gas |

AIR TRANSPORTATION

| | |
|--------------------------|---------------|
| ICAO/IATA Code | 1001 |
| Class | 2.1 |
| Subsidiary Risk | Flammable gas |
| Packaging Group | |
| Packaging Instructions | |
| - Cargo | Forbidden |
| - Passenger | Forbidden |
| Maximum Quantity Allowed | |
| - Cargo | Forbidden |
| - Passenger | Forbidden |

15 REGULATORY INFORMATION

EEC Hazard Class Flammable Gas

Risk Phrases:

- R2 Risk of explosion by shock, friction, fire or other sources of ignition
- R11 Highly flammable
- R44 Risk of explosion if heated under confinement

Safety Phrases:

- S2 Keep out of reach of children
- S15 Keep away from heat
- S16 Keep away from sources of ignition
- S33. Take precautionary measures against static discharges
- S37 Wear suitable gloves
- S39 Wear eye / face protection
- S51 Use only in well-ventilated areas

National Legislation None

Refer to SANS 10265 for explanation of the above Phrases.

16 OTHER INFORMATION

Bibliography

- Compressed Gas Association, Arlington, Virginia
- Handbook of Compressed Gases - 3rd Edition
- Matheson. Matheson Gas Data Book - 6th Edition
- SANS 10265 - Labelling of Dangerous Substances

17 EXCLUSION OF LIABILITY

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