SAFETY DATA SHEET
Acetylene, dissolved

Issue Date: 10.07.2013
Last revised date: 31.03.2015
Version: 0.0
SDS No.: 000010021936

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Product name: Acetylene, dissolved
Trade name:
   i) Purified
   ii) High Purity (HP)

Additional identification
Chemical name: Acetylene (ethyne)
Chemical formula: \( \text{C}_2\text{H}_2 \)
INDEX No. 601-015-00-0
CAS-No. 74-86-2
EC No. 200-816-9

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


Uses advised against

1.3 Details of the supplier of the safety data sheet

Supplier
Linde Malaysia Sdn Bhd (100783-W), No 13, Jalan 222, 46100 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Toll Free: 1800 883 888
E-mail: csc.lq.my@linde.com

1.4 Emergency telephone number:
Emergency phone numbers (24h): 03-79554233
Poison center Unit HAZMAT Malaysia, tel: 999

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended.
Physical Hazards
   Flammable gas Category 1 H220: Extremely flammable gas.
   Gases under pressure Dissolved gas H280: Contains gas under pressure; may explode if heated.

2.2 Label Elements

Signal Words: Danger

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Hazard Statement(s):
H220: Extremely flammable gas.
H280: Contains gas under pressure; may explode if heated.

Precautionary Statement
Prevention:
P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response:
P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381: Eliminate all ignition sources if safe to do so.

Storage:
P403: Store in a well-ventilated place.

Disposal:
P501: Dispose of cylinder via gas supplier only; cylinder contains a porous material which in some cases contains asbestos.

2.3 Other hazards:
For safety reasons, the acetylene is dissolved in acetone or dimethylformamide in the gas receptacle. Vapour of the solvent is carried away as impurity when the acetylene is extracted from the gas receptacle. The concentration of the solvent vapour in the gas is lower than the concentration limits to change the classification of the acetylene.

SECTION 3: Composition/ information on ingredients

3.1 Substances
Chemical name: acetylene (ethyne)
INDEX No.: 601-015-00-0
CAS-No.: 74-86-2
EC No.: 200-816-9
Purity: 100%
The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted.

Trade name:

SECTION 4: First aid measures

General:
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

4.1 Description of first aid measures
Inhalation:
In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Eye contact:
Adverse effects not expected from this product.

Skin Contact:
Adverse effects not expected from this product.

Ingestion:
Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms and effects, both acute and delayed:
Respiratory arrest.

4.3 Indication of any immediate medical attention and special treatment needed
Hazards: None.
Treatment: None.

SECTION 5: Firefighting measures

General Fire Hazards:
Heat may cause the containers to explode.

5.1 Extinguishing media
Suitable extinguishing media: Water Spray or Fog. Dry powder. Foam.

Unsuitable extinguishing media: Carbon Dioxide.

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5.2 Special hazards arising from the substance or mixture:

Fire or excessive heat may produce hazardous decomposition products. When involved in a fire, acetylene can begin to decompose, breaking down into its constituent elements of hydrogen and carbon. The decomposition reaction is exothermic and produces heat. Acetylene cylinders are designed to contain and inhibit decomposition of acetylene, however, if left unchecked decomposition could lead to cylinder failure. Acetylene may continue to be a hazard after an external fire has been extinguished, due to the decomposition of the acetylene within the cylinder, and requires specific operational procedures.

Hazardous Combustion Products:
If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: carbon monoxide.

5.3 Advice for firefighters

Special firefighting procedures:
In case of fire: Stop leak if safe to do so. Do not extinguish flames at leak because possibility of uncontrolled explosive reignition exists. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out. Acetylene cylinders that have been heated, damaged by fire or subjected to a flash back must not be moved until it has been demonstrated that there is no decomposition of the acetylene within the cylinder. Acetylene cylinders should be cooled with a water spray and a hazard zone designated around them. Water cooling should be continued for at least one hour. After a minimum of one hour of water cooling the cylinder's temperature should be checked to see if it has been effectively cooled. Effectively cooled means bringing the cylinder shell temperature down to ambient temperature. The “Wetting test” and/or thermal imaging equipment should be used to ascertain if the cylinder shell has been effectively cooled. When effective cooling of the cylinder shell has been achieved, water cooling should be stopped. The cylinder should still not be moved for a further one hour, during this time temperature checks of the cylinder shell should be made every 15 minutes. If any increase in temperature is observed further one hour continuous water cooling should be applied to the cylinder before its temperature is re-checked. When the cylinder shell temperature remains at ambient temperature for one hour without being water cooled, and is not leaking, the cylinder may be moved.

Special protective equipment for firefighters:
Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for firefighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:
Evacuate area. Provide adequate ventilation. Consider the risk of potentially explosive atmospheres. Eliminate all ignition sources if safe to do so. Monitor the concentration of the released product. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

6.2 Environmental Precautions:
Prevent further leakage or spillage if safe to do so.

6.3 Methods and material for containment and cleaning up:
Provide adequate ventilation. Eliminate sources of ignition.

6.4 Reference to other sections:
Refer to sections 8 and 13.
SECTION 7: Handling and storage

7.1 Precautions for safe handling:

Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service. Purge air from system before introducing gas. Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide. Assess the risk of a potentially explosive atmosphere and the need for suitable equipment i.e. explosion-proof. Take precautionary measures against static discharges. Keep away from ignition sources (including static discharges). Provide electrical earthing of equipment and electrical equipment usable in explosive atmospheres. Use only non-sparking tools. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Ensure the complete system has been (or is regularly) checked for leaks before use. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 30°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with local/region/national/international regulations. Never use direct flame or electrical heating devices to raise the pressure of a container. Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use. Damaged valves should be reported immediately to the supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminates particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place. Avoid suckback of water, acid and alkalis. Solvent may accumulate in piping systems. For maintenance use appropriately chemically resistant gloves and goggles. Only equipment fitted with suitable means of preventing a ‘flash back’ should be fitted to the cylinders. Mechanical shock alone to a cold acetylene cylinder cannot initiate decomposition.

7.2 Conditions for safe storage, including any incompatibilities:

All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere. Segregate from oxidant gases and other oxidants being stored. Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material. Acetylene cylinders should be stored vertically. If a cylinder has been transported horizontally, it should be stood upright for a minimum of 1 hour prior to use. This will allow the acetone to evenly re-distribute within the cylinder and prevent acetone being carried into the flame during use causing a 'flame thrower' effect.

7.3 Specific end use(s):

None.
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Individual protection measures, such as personal protective equipment

General information: A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered. Keep self-contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment. Do not eat, drink or smoke when using the product.

Eye/face protection: Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases.
Guideline: EN 166 Personal Eye Protection.

Skin protection
Hand Protection: Wear working gloves while handling containers
Guideline: EN 388 Protective gloves against mechanical risks.

Body protection: Wear fire/ flame resistant/ retardant clothing.

Other: Wear safety shoes while handling containers
Guideline: EN 345 Personal protective equipment - Safety footwear.

Respiratory Protection: Not required.
Thermal hazards: No precautionary measures are necessary.
Hygiene measures: Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.

Environmental exposure controls: For waste disposal, see section 13 of the SDS.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance
Physical state: Gas
Form: Dissolved gas
Color: Colorless
Odor: Garlic-like odor

Odor Threshold: Odor threshold is subjective and is inadequate to warn of over exposure.

pH: not applicable.

Melting Point: -80,7 °C
Boiling Point: -84,7 °C

Sublimation Point: not applicable.

Critical Temp. (°C): 35,0 °C

Flash Point: Not applicable to gases and gas mixtures.

Evaporation Rate: Not applicable to gases and gas mixtures.

Flammability (solid, gas): Flammable gas
Flammability Limit - Upper (%):- 99,99 % (V)
Flammability Limit - Lower (%):- 2,3 % (V)

Vapor pressure: 698,5968 kPa (25 °C); 4.460 kPa (20 °C); 4.535 kPa (22 °C)

Vapor density (air=1): 0,91 AIR=1

Relative density: 0,6208 (-82 °C) 4 °C

Solubility(ies)
Solubility in Water: 1.200 mg/ l (25 °C)

Partition coefficient (n-octanol/ water): 0,37

Autoignition Temperature: 305 °C

Decomposition Temperature: 635 °C

Viscosity
Kinematic viscosity: No data available.
Dynamic viscosity: 0,011 mPa.s

Explosive properties: Not applicable.

Oxidizing properties: Not applicable.
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9.2 Other information:
Molecular weight: 26.02 g/mol (C2H2)
Minimum ignition energy: 0 mJ

SECTION 10: Stability and reactivity

10.1 Reactivity:
No reactivity hazard other than the effects described in sub-section below.

10.2 Chemical Stability:
Stable under normal conditions.

10.3 Possibility of Hazardous Reactions:
Can form a potentially explosive atmosphere in air. May react violently with oxidants. Forms explosive acetylides with copper, silver and mercury. Do not use alloys containing more than 65% copper.

10.4 Conditions to Avoid:
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. High temperature High pressure May decompose violently at high temperature and/or pressure or in the presence of a catalyst.

10.5 Incompatible Materials:
Air and oxidizers. For material compatibility see latest version of ISO-11114. Avoid contact with pure copper, mercury, silver and brass with greater than 65% copper. Do not use alloys containing more than 43% silver. For further information on safe use refer to EIGA "Code of Practice: Acetylene" IGC Doc 123.

10.6 Hazardous Decomposition Products:
Under normal conditions of storage and use, hazardous decomposition products should not be produced. If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: The following decomposition products may be produced: carbon monoxide

SECTION 11: Toxicological information

General information:
None.

11.1 Information on toxicological effects
Acute toxicity - Inhalation
Product: acetylene (ethyne)
Based on available data, the classification criteria are not met.
LC0 (Rat, 4 h): 160,500 mg/m3
LOEC: 100000 ppm
LOAEL (Rat): 78 %
LC50 (Dog): >85000 ppm
LOAEL (Rat): 90 %

Skin Corrosion/ Irritation
Product
Based on available data, the classification criteria are not met.

Serious Eye Damage/ Eye Irritation
Product
Based on available data, the classification criteria are not met.

Respiratory or Skin Sensitization
Product
Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity
Product
Based on available data, the classification criteria are not met.

Carcinogenicity
Product
Based on available data, the classification criteria are not met.

Reproductive toxicity
Product
Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Single Exposure
Product
Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure
Product
Based on available data, the classification criteria are not met.

Aspiration Hazard
Product
Not applicable to gases and gas mixtures.

SECTION 12: Ecological information

12.1 Toxicity
Acute toxicity
Product
No ecological damage caused by this product.

Acute toxicity - Fish
acetylene (ethyne)
LC50 (Fish, 96 h): 545 mg/l

Acute toxicity - Aquatic Invertebrates
acetylene (ethyne)
EC50 (Water flea (Daphnia magna), 48 h): 242 mg/l
Toxicity to microorganisms: Acetylene (ethyne)

EC50 (Alga, 72 h): 57 mg/l

Additional ecological information:

12.2 Persistence and Degradability Product
No ecological damage caused by this product.

12.3 Bioaccumulative Potential Product
Not applicable to gases and gas mixtures.

12.4 Mobility in Soil Product
The product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

12.5 Results of PBT and vPvB assessment Product
Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.6 Other Adverse Effects
Not classified as PBT or vPvB.

No ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information:
Do not discharge into any place where its accumulation could be dangerous. Consult supplier for specific recommendations. Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor. Dispose of cylinder via gas supplier only; cylinder contains a porous material which in some cases contains asbestos.

Disposal methods:
Refer to the EIGA code of practice (Doc.30 "Disposal of Gases", downloadable at http://www.eiga.org) for more guidance on suitable disposal methods. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

Container:
Gases in pressure containers (including halons) containing dangerous substances.

SECTION 14: Transport information

ADR
14.1 UN Number: UN 1001
14.2 UN Proper Shipping Name: ACETYLENE, DISSOLVED
14.3 Transport Hazard Class(es):
   Class: 2
   Label(s): 2.1
   Hazard No. (ADR): 239
   Tunnel restriction code: (B/ D)
14.4 Packing Group: -
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -

RID
14.1 UN Number: UN 1001
14.2 UN Proper Shipping Name: ACETYLENE, DISSOLVED
14.3 Transport Hazard Class(es):
   Class: 2
   Label(s): 2.1
14.4 Packing Group: -
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -

IMDG
14.1 UN Number: UN 1001
14.2 UN Proper Shipping Name: ACETYLENE, DISSOLVED
14.3 Transport Hazard Class(es):
   Class: 2.1
   Label(s): 2.1
   EmS No.: F-D, S-U
14.3 Packing Group: -
14.5 Environmental hazards: not applicable
14.6 Special precautions for user: -
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IATA
14.1 UN Number: UN 1001
14.2 Proper Shipping Name: ACETYLENE, DISSOLVED
14.3 Transport Hazard Class(es):
   - Class: 2.1
   - Label(s): 2.1
14.4 Packing Group: –
14.5 Environmental hazards: not applicable
14.6 Special precautions for user:
   - Another information
     - Passenger and cargo aircraft: Forbidden.
     - Cargo aircraft only: Allowed.

Additional identification: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers ensure that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:

   National Regulations
   - Occupational Safety and Health Act 1994 and relevant regulations:
     - Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013.
     - Occupational Safety and Health (Use And Standards of Exposure of Chemicals Hazardous To Health) Regulations 2000
   - Environment Quality Act 1974 & regulations:
     - Environment Quality (Clean Air) Regulations 2014
     - Environmental Quality (Scheduled Wastes) Regulations 2005

15.2 Chemical safety assessment: CSA has been carried out.

SECTION 16: Other information

Training information: Users of breathing apparatus must be trained. Ensure operators understand the flammability hazard.

Other information: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. Ensure equipment is adequately earthed. Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

Linde Safety Advice
1. Transporting Cylinders or Cryogenic Receptacles in Enclosed Vehicle
2. Using Acetylene Safely for Welding and Cutting Work
3. Safe Cylinder Handling