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MATERIAL SAFETY DATA SHEET
No. 10

SECTION 1. PRODUCT INFORMATION

NAME: Isobutane

TRADE NAME AND SYNONYMS: Methyl Propane; Petroleum gas, liquefied (D.O. T.)

APPEARANCE AND ODOR: Colorless, odorless gas

CHEMICAL NAME AND SYNONYMS: Isobutane; Methylpropane

CAS #: 75-28-5

DOT I.D. No: UN 1969 or UN 1075 if Petroleum gas, liquefied

DOT HAZARD CLASS: Division 2.1

CHEMICAL FORMULA: (iso) C_4H_{10}

CHEMICAL FAMILY: Aliphatic hydrocarbon

ISSUE DATE AND REVISIONS: Revised September 2005

SECTION 2. HEALTH HAZARD DATA

EMERGENCY OVERVIEW: Isobutane is a flammable gas which is approximately 2 times heavier than air. Inhalation: Moderate concentrations so as to exclude an adequate supply of oxygen to the lungs causes dizziness, drowsiness and eventual unconsciousness. It is also a narcotic which acts as a depressant on the central nervous system.

Contact with the rapidly evaporating liquid could cause frostbite or cryogenic "burns".

TIME WEIGHTED AVERAGE EXPOSURE LIMIT: Isobutane is defined as an Aliphatic Hydrocarbon Gas (C1-C4) with a TWA of 1,000 Molar PPM (ACGIH 2004). OSHA 2004 has no listing for Isobutane. L.P.G. (Liquefied Petroleum Gas) contains Isobutane and has a PEL (8 Hr. TWA) of 1,000 Molar PPM.

Oxygen levels should be maintained at greater than 19.5 Molar percent at normal atmospheric pressure (pO_2 >148 torr).

TOXICOLOGICAL PROPERTIES: Breathing high concentrations causes a narcotic effect; however, the major property is the exclusion of an adequate supply of oxygen to the lungs.

Frostbite effects are a change in the color of the skin to gray or white possibly followed by blistering.

Isobutane is not listed in the IARC, NTP or by OSHA as a carcinogen or potential carcinogen.

Persons in ill health where such illness would be aggravated by exposure to Isobutane should not be allowed to work with or handle this product.

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

SECTION 2. HEALTH HAZARD DATA, (CONT'D)

RECOMMENDED FIRST AID TREATMENT, (CONT'D)

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 assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

Dermal Contact or Frostbite: Remove contaminated clothing and flush affected areas with lukewarm water. DO NOT USE HOT WATER. A physician should see the patient promptly if the cryogenic "burn" has resulted in blistering of the dermal surface or deep tissue freezing.

SECTION 3. FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): -117°F (-83°C) closed cup

AUTO IGNITION TEMPERATURE: 788°F (420°C)

FLAMMABLE LIMITS (% BY VOLUME) LEL= 1.8 UEL= 8.4

EXTINGUISHING MEDIA: Water, carbon dioxide, dry chemical

SPECIAL FIRE FIGHTING PROCEDURES: If possible, stop the flow of Isobutane. Use water spray to cool surrounding containers.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Isobutane is heavier than air and may travel a considerable distance to a source of ignition. Should flame be extinguished and flow of gas continue, increase ventilation to prevent flammable mixture accumulation in low areas or pockets.

SECTION 4. 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 the 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 the emergency telephone number listed herein

SECTION 5. HAZARDOUS MIXTURE PRECAUTIONS

Isobutane is flammable in air

SECTION 6. REACTIVITY DATA

STABILITY: Stable

CONDITIONS TO AVOID: High temperature. Isobutane begins to decompose at 815°F (435°C).

INCOMPATIBILITY (MATERIALS TO AVOID): Oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: None

HAZARDOUS POLYMERIZATION POTENTIAL: Will not occur

CONDITIONS TO AVOID: None

SECTION 7. SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION: DOT Shipping Name: Isobutane or Petroleum gas, liquefied; DOT Shipping Label: Flammable Gas; DOT Hazard Class: Division 2.1; I. D. No: UN 1969 or UN 1075 if Petroleum gas, liquefied

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 connecting cylinder to lower pressure (<100 psig) piping or systems. 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 handling recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14 and Safety Bulletin SB-2.

SPECIAL STORAGE RECOMMENDATIIONS: Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of noncombustible construction away from heavily trafficked areas and emergency exits. 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. 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 area. There should be no sources of ignition in the storage area.

For additional storage recommendations, consult Compressed Gas Association's Pamphlets P-1, P-14 and Safety Bulletin SB-2.

SPECIAL PACKAGING RECOMMENDATIONS: Isobutane is non-corrosive and may be used with any common structural material.

*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 this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

SECTION 8. SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION: Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.

SECTION 8. SPECIAL PROTECTION INFORMATION (CONT'D)

VENTILATION: Hood with forced ventilation
LOCAL EXHAUST: To prevent accumulation above the LEL
SPECIAL: N/A
MECHANICAL: In accordance with electrical codes
OTHER: N/A

PROTECTIVE GLOVES: Plastic or rubber

EYE PROTECTION: Safety goggles or glasses

OTHER PROTECTIVE EQUIPMENT: Safety shoes, Safety shower, eyewash "fountain"

SECTION 9. PHYSICAL DATA

BOILING POINT: 10.9°F (-11.7°C)

LIQUID DENSITY AT BOILING POINT: 36.8 lb/ft3 (589.5 kg/m3)

VAPOR PRESSURE: @70°F (21.1°C) = 45 psia (310 kPa)

GAS DENSITY AT 70° F, 1atm: .1543 lb/ft3 (2.472 kg/m3)

SOLUBILITY IN WATER: Very slightly

FREEZING POINT: -255.3°F (-159.6°C)

EVAPORATION RATE: N/A (Gas)

SPECIFIC GRAVITY (Air =1): @70°F (21.1°C) = 2.06

SECTION 10. ADDITIONAL RECOMMENDATIONS OR PRECAUTIONS:

Earth-ground and bond all lines and equipment associated with the Isobutane 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).

Always secure cylinders in an upright position before transporting them. NEVER transport cylinders in trunks of vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cylinders secured in open flatbed or in open pick-up type vehicles.

Reporting under SARA, Title III, Section 313 not required.

NFPA 704 No. for Isobutane = 1 (Health) 4 (Flammability) 0 (Instability) None (Special)

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