LES GAZ INDUSTRIELS LTD.
UNE VALEUR SÛRE
Est. 1952

# MATERIAL SAFETY DATA SHEET

# BUTANE

DATE: May 2008 Version no.1

## 1 PRODUCT AND COMPANY IDENTIFICATION

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| | |
|---|---|
| Product Names | n-BUTANE<br>iso-Butane |
| Chemical Formula | $C_4H_{10}$ |
| Trade Name | Butane, Pure |
| Colour Coding | Dulux Light Weatherwork Grey body with Red (A11) circle, 250 mm diameter, below the valve. |
| Valve | OMECA – Brass 5/8 inch BSP left hand female. (vapour outlet).<br>Liquid outlet. ¼ inch flare fitting. |
| Company Identification | Les Gaz Industriels Ltd<br>Pailles Road<br>G.R.N.W. – Republic of Mauritius<br>Tel. No: (+230) 212 8306<br>Fax No: (+230) 212 0235 |

## 2 COMPOSITION/INFORMATION ON INGREDIENTS

| | |
|---|---|
| Chemical Names | n-Butane<br>iso-Butane |
| Chemical Family | Aliphatic hydrocarbons |
| CAS No. | 106-97-8 |
| UN No. | 1969 |
| ERG No. | 115 |
| Hazchem Warning | 2 A Flammable gas |

## 3 HAZARDS IDENTIFICATION

**Main Hazards.** All cylinders are portable gas containers, and must be regarded as pressure vessels at all times. Vapourised Butane liquid is highly flammable and can form explosive mixtures with air. The flammability limits in air are 1,8 -8,4% by volume. Vapourised Butane does not support life. It can act as a simple asphyxiant by diluting the concentration of oxygen in air to below levels necessary to support life. Exposure to the liquid phase could result in serious cold burns.

**Adverse Health effects.** Butane is non-toxic. Prolonged inhalation of high concentrations has an anaesthetic effect, but could also act as a simple asphyxiant by displacing the oxygen in the air to below levels necessary to support life.

**Chemical hazards.** On complete combustion no hazardous compounds are formed.

**Biological hazards.** Contact with the liquid phase could result in frostbite.

**Vapour inhalation.** Since vapourised Butane acts as a simple asphyxiant, death may result from errors in judgement, confusion, or loss of consciousness which prevents self-rescue. At low oxygen concentrations, unconsciousness and death may occur in seconds without warning.

| | | | |
|---|---|---|---|
| **Eye Contact.** | Vapour Phase | - | None |
| | Liquid Phase | - | Serious cold burns could result |
| **Skin Contact.** | Vapour Phase | - | None |
| | Liquid Phase | - | Frostbite |
| **Ingestion**. | Liquid Phase | - | Serious cold burns could result |

## 4 FIRST AID MEASURES

Prompt medical attention is mandatory in all cases of overexposure to vapourised Butane. Rescue personnel should be equipped with self-contained breathing apparatus. In case of frostbite from contact with the liquid phase, place the frost-bitten part in warm water, about 40-42°C. If warm water is not available, wrap the affected part gently in blankets. Encourage the patient to exercise the affected part whilst it is being warmed. Do not remove clothing while frosted. 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 removed to an uncontaminated area, and given mouth-to-mouth resuscitation and supplemental oxygen.

**Eye contact.** (With liquid phase) Immediately flush with large quantities of tepid water, or with sterile saline solution. Seek medical attention.

**Skin contact.** (With liquid phase) See above for handling of frostbite.

**Ingestion**. No known effect

## 5 FIRE FIGHTING MEASURES

**Extinguishing media.** Do not extinguish fire unless the leakage can be stopped. Do not use water jet. Use dry chemical, $CO_2$ or foam.

**Specific hazards.** The rupturing cylinders or bulk containers due to excessive exposure to a fire could result in a BLEVE (Boiling Liquid Expanding Vapour Explosion), with disastrous effects. As the flammability limits in air for Butane are 1,8 - 8,4% by volume, extreme care must be taken when handling leaks.

**Emergency actions**. If possible, shut off the source of the spillage. Evacuate area. Post notices "NO NAKED LIGHTS - NO SMOKING". Prevent liquid or vapour from entering sewers, basements and work-pits. Keep cylinders or bulk vessels cool by spraying with water if exposed to a fire. If tanker has overturned, do not attempt to right or move it. CONTACT THE NEAREST AFROX BRANCH.

**Protective clothing**. Self-contained breathing apparatus. Safety gloves, goggles and shoes or boots should be worn when handling containers.

**Environmental precautions.** Vaporised Butane is heavier than air and could form pockets of oxygen-deficient atmosphere in low-lying areas.

## 6 ACCIDENTAL RELEASE MEASURES

**Personal Precautions.** Do not enter any area where Butane has been spilled unless tests have shown that it is safe to do so.

**Environmental precautions.** The danger of widespread formation of explosive Butane/Air mixtures should be taken into account. Accidental ignition could result in a massive explosion.

**Small spills.** DO NOT extinguish the fire unless the leakage can be stopped immediately. Once the fire has been extinguished and all spills have been stopped, ventilate the area.

**Large spills.** Stop the source if it can be done without risk. Contain the leaking liquid with sand or earth, or disperse with special water/fog spray nozzle. Allow to evaporate. Take the precautions as listed above under "Emergency Actions". Restrict access to the area until completion of the clean-up procedure. Ventilate the area using forced draught if necessary. All electrical equipment should be flameproof.

## 7 HANDLING AND STORAGE

Cylinders containing Butane should only be handled and stored in the vertical position. Cylinders should never be rolled. Do not allow cylinders to slide or come into contact with sharp edges, and they should be handled carefully. Ensure that cylinders are stored away from other oxidants. Comply with all local legislation. Keep out of reach of children.

## 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

**Occupational exposure hazards.** As vapourised Butane is a simple asphyxiant, avoid any areas where spillage has taken place. Only enter once testing has proved the atmosphere to be safe.

**Engineering control measures.** Engineering control measures are preferred to reduce exposure to oxygen depleted atmospheres. General methods include forced-draught ventilation, separate from other exhaust ventilation systems. Ensure that sufficient fresh air enters at, or near, floor level. Ensure that all electrical equipment is flameproof.

**Personal protection**. Self-contained breathing apparatus should always be worn when entering area where oxygen depletion may have occurred. Safety goggles, gloves and shoes, or boots, should be worn when handling containers.

**Skin**. Wear loose-fitting overalls, preferably without pockets.

## 9 PHYSICAL AND CHEMICAL PROPERTIES

**PYSICAL DATA**

| | |
|---|---|
| Chemical Symbol | $C_4H_{10}$ |
| Molecular Weight | 58,124 |
| Specific volume @ 20°C & 101,325 kPa | 398 ml/g |
| Boiling point @ 101,32 kPa | - 0,5°C |
| Density, gas @ 20°C & 101,35 kPa | 2,544 kg/$m^3$ |
| Relative density (Air = 1) | 2,11 |
| Auto-ignition temperature | 430°C |
| Flammability limits in air | 1,8 - 8,4% (by volume) |
| Colour | None |
| Taste | None |
| Odour | Slight |

## 10 STABILITY AND REACTIVITY

**Conditions to avoid**. The dilution of the oxygen concentration in the atmosphere to levels which cannot support life. The formation of explosive gas/air mixtures.

**Incompatible materials.** Any common, commercially available metals may be used with Butane as it is non-corrosive, though installations must be designed to withstand the pressures involved and must comply with all state and local regulations.

**Hazardous Decomposition products.** The formation of carbon monoxide may occur when incomplete combustion occurs.

## 11 TOXICOLOGICAL INFORMATION

| | |
|---|---|
| Acute Toxicity | TLV 600 vpm |
| Skin & eye contact | No known effect |
| Chronic Toxicity | No known effect |
| Carcinogenicity | Severe cold burns can result in carcinoma |
| Mutagenicity | No known effect |
| Reproductive Hazards | No known effect |

## 12 ECOLOGICAL INFORMATION

Vapourised Butane is heavier than air, and can cause pockets of oxygen-depleted atmosphere in low-lying areas. It does not pose a hazard to the ecology, unless the gas/air mixture is ignited.

## 13 DISPOSAL CONSIDERATIONS

**Disposal Methods.** Personnel familiar with the gas and the procedures for disposal, as with other gases, should only undertake disposal of Butane. Contact supplier for instructions. In general, should it become necessary to dispose of Butane, the best procedure, as for other flammable gases, is to burn it in

any suitable burning unit available in the plant. This should be done in accordance with the appropriate regulations.

**Disposal of packaging.** The gas supplier must only handle the disposal of containers.

## 14 TRANSPORT INFORMATION

**ROAD TRANSPORTATION**

| | |
|---|---|
| UN No. | 1969 |
| ERG No. | 115 |
| Hazchem warning | 2 A Flammable gas |

**SEA TRANSPORTATION**

| | |
|---|---|
| IMDG | 1969 |
| Class | 2.1 |
| Label | Flammable gas |

**AIR TRANSPORTATION**

| | |
|---|---|
| ICAO/IATA Code | 1969 |
| Class | 2.1 |
| Packaging instructions | |
| - Cargo | 200 |
| - Passenger | Forbidden |
| Maximum quantity allowed | |
| - Cargo | 150 kg |
| - 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 |
| | R5 Heating may cause an explosion |
| | R13 Extremely flammable liquefied gas |
| | R16 Explosive when used with oxidising substances |
| | R18 In use may form flammable explosive vapour-air mixture |
| | R44 Risk of explosion if heated under confinement |
| Safety phrases | S2 Keep out of reach of children |
| | S3 Keep in a cool place |
| | S4 Keep away from living quarters |
| | S9 Keep container in a well-ventilated place |
| | S15 Keep away from heat |
| | S16 Keep away from sources of ignition |
| | S21 When using do not smoke |
| | S29 Do not empty into drains |
| | S33 Take precautionary measures against static discharges |
| | S37 Wear suitable gloves |
| | S38 In case of insufficient ventilation, wear suitable respiratory equipment |
| | S51 Use only in well-ventilated areas |
| National legislation | None |

Refer to SANS 10265 for explanation of the above.

## 16 OTHER INFORMATION

Bibliography

Compressed Gas Association, Arlington, Virginia
Handbook of Compressed Gases - 3rd Edition
Matheson. Matheson Gas Data Book - 6th Edition

## 17 EXCLUSION OF LIABILITY

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