



MATERIAL SAFETY DATA SHEET

BUTANE

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Version no.1

1 PRODUCT AND COMPANY IDENTIFICATION

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Product Names n-BUTANE
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).
Liquid outlet. ¼ inch flare fitting.

Company Identification Les Gaz Industriels Ltd
Pailles Road
G.R.N.W. – Republic of Mauritius
Tel. No: (+230) 212 8306
Fax No: (+230) 212 0235

2 COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Names n-Butane
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

PHYSICAL 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 ppm
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

Safety phrases

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
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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For product and safety enquiries please phone
EMERGENCY N°:
+230 800 1133 (business hours)