

## MATERIAL SAFETY DATA SHEET (MSDS)

### BUTANE

Please ensure that this MSDS is received by an appropriate person

DATE: May 2015

Version 3

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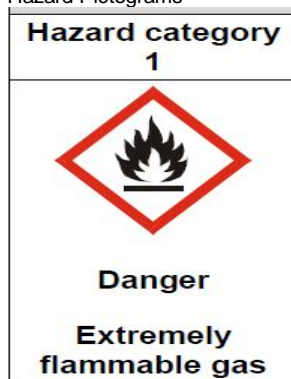
Ref. No.: MS088

#### 1 PRODUCT AND COMPANY IDENTIFICATION

<b>Product Name</b>	n-Butane iso-Butane
<b>Chemical Formula</b>	C <sub>4</sub> H <sub>10</sub> r
<b>Trade Names</b>	Butane, Pure
<b>Colour coding</b>	Dulux Light Weatherwork, Grey body with Red (A11) circle, 250 mm diameter, below the valve.
<b>Valve</b>	OMECA: Brass 5/8 inch BSP left hand female (vapour outlet) Liquid outlet ¼ inch flare fitting
<b>Company Identification</b>	African Oxygen Limited 23 Webber Street Johannesburg, 2001 Tel No: (011) 490-0400 Fax No: (011) 490-0506
<b>EMERGENCY NUMBER</b>	<b>0860 020202 or (011) 873 4382 (24 hours)</b>

Label Elements

Hazard Pictograms



Precautionary Statements:

- P210: Keep away from heat/sparks/open flames/hot surfaces  
P377: Leaking gas fire: Do not extinguish unless leak can be stop safely  
P381: Eliminate all sources of ignition  
P403: Store in well ventilated place

#### 2 COMPOSITION/INFORMATION ON INGREDIENTS

<b>Chemical Name</b>	n-Butane Iso-Butane
<b>Chemical Family</b>	Aliphatic hydrocarbons
<b>CAS No.</b>	106-97-8
<b>UN No.</b>	1969
<b>ERG No.</b>	115
<b>Hazard Warning</b>	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. Vaporised Butane liquid is highly flammable and can form explosive mixtures with air. The flammability limits in air are 1,8 -8,4% by volume. Vaporised 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 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 vaporised 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
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#### 4 FIRST AID MEASURES

Prompt medical attention is mandatory in all cases of overexposure to vaporised 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

Liquid Phase - Immediately flush with large quantities of tepid water, or with sterile saline solution. Seek medical attention.

##### Skin Contact

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<sub>2</sub> 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

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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.

#### 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 <sub>4</sub> H <sub>10</sub>
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 <sup>3</sup>
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

(For further information see Section 3. Adverse Health effects)

## 12 ECOLOGICAL INFORMATION

Vaporised 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

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#### 15 REGULATORY INFORMATION

Hazard Statement	Description
H220	Extremely flammable gas

National legislation: OHSAct & Regulations 85 of 1993  
Refer to SABS 10234 Globally Harmonized System of classification and labelling of Chemicals (GHS) for explanation of the above.

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#### 16 OTHER INFORMATION

##### Bibliography

Compressed Gas Association, Arlington, Virginia  
Handbook of Compressed Gases – 3<sup>rd</sup> Edition  
Matheson. Matheson Gas Data Book – 6<sup>th</sup> Edition

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#### 17 EXCLUSION OF LIABILITY

Information contained in this publication is accurate at the date of publication. The company does not accept liability arising from the use of this information, or the use, application, adaptation or process of any products described herein.