

## Material Safety Data Sheet

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Version 1.1

According to 91/155/EEC

Classified as Hazardous according to the criteria of EU Annex 1 and NOHSC.

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1 - Product and Company Information

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Product Name	2-CHLOROBUTANE, 99+%
Product Number	C28898
Company	Sigma-Aldrich Pty. Ltd. 12 Anella Avenue Castle Hill NSW 2154 Australia
Technical Phone #	+61 2 9841 0555 (1800 800 097)
Fax	+61 2 9841 0500 (1800 800 096)
Emergency Phone #	+44 8701906777 (1800 448 465)

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2 - Composition/Information on Ingredients

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Product Name	CAS #	EC no	Annex I Index Number
2-CHLOROBUTANE	78-86-4	201-151-7	None
Formula	C4H9Cl		
Molecular Weight	92.57 AMU		
Synonyms	sec-Butyl chloride * 2-Chlorobutane * 1-Methylpropyl chloride		

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3 - Hazards Identification

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SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT  
Highly flammable.

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4 - First Aid Measures

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## AFTER INHALATION

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

## AFTER SKIN CONTACT

Flush skin with water.

## AFTER EYE CONTACT

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

## AFTER INGESTION

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

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5 - Fire Fighting Measures

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EXTINGUISHING MEDIA

Suitable: Carbon dioxide, dry chemical powder, or appropriate foam.

Unsuitable: Carbon Dioxide, dry chemical powder, or appropriate foam. Water can be applied as a spray or fog and if properly applied is capable of extinguishing the fire by sweeping the flames off the surface of the burning liquid.

#### SPECIAL RISKS

Specific Hazard(s): Extremely flammable. Vapor may travel considerable distance to source of ignition and flash back. Emits toxic fumes under fire conditions.

Explosion Hazards: Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions. Forms explosive mixtures in air.

#### SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

#### SPECIFIC METHOD(S) OF FIRE FIGHTING

Use water spray to cool fire-exposed containers.

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### 6 - Accidental Release Measures

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#### PERSONAL PRECAUTION PROCEDURES TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

#### PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

#### METHODS FOR CLEANING UP

Cover with an activated carbon adsorbent, take up and place in closed containers. Transport outdoors. Ventilate area and wash spill site after material pickup is complete.

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### 7 - Handling and Storage

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#### HANDLING

Directions for Safe Handling: Do not get in eyes, on skin, on clothing. Do not breathe vapor. Avoid prolonged or repeated exposure.

#### STORAGE

Conditions of Storage: Keep tightly closed. Keep away from heat, sparks, and open flame. Store in a cool dry place.

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### 8 - Exposure Controls / Personal Protection

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#### ENGINEERING CONTROLS

Use only in a chemical fume hood. Safety shower and eye bath.

#### GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Wash contaminated clothing before reuse.

#### PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection: Government approved respirator.

Hand Protection: Compatible chemical-resistant gloves.

Eye Protection: Chemical safety goggles.

## 9 - Physical and Chemical Properties

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Appearance	Color: Colorless Form: Clear liquid	
Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	67 - 69 °C	
MP/MP Range	-140 °C	
Flash Point	-15 °C	Method: closed cup
Flammability	N/A	
Autoignition Temp	N/A	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	N/A	
Vapor Pressure	N/A	
SG/Density	0.872 g/cm3	
Partition Coefficient	N/A	
Viscosity	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
Evaporation Rate	N/A	
Bulk Density	N/A	
Decomposition Temp.	N/A	
Solvent Content	N/A	
Water Content	N/A	
Surface Tension	N/A	
Conductivity	N/A	
Miscellaneous Data	N/A	
Solubility	N/A	

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## 10 - Stability and Reactivity

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### STABILITY

Materials to Avoid: Strong oxidizing agents, Strong bases.

### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Hydrogen chloride gas.

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## 11 - Toxicological Information

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RTECS NUMBER: EJ6475000

### ACUTE TOXICITY

LD50  
Oral  
Rat  
20 ML/KG

LD50  
Skin  
Rabbit  
20 ML/KG

### SIGNS AND SYMPTOMS OF EXPOSURE

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

### ROUTE OF EXPOSURE

Skin Contact: May cause skin irritation.  
Eye Contact: May cause eye irritation.  
Multiple Routes: Harmful if swallowed, inhaled, or absorbed through skin.

#### CHRONIC EXPOSURE - CARCINOGEN

Mouse  
Route of Application: Intraperitoneal  
Exposure Time: 8W  
Result: Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors.

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#### 12 - Ecological Information

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No data available.

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#### 13 - Disposal Considerations

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#### SUBSTANCE DISPOSAL

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

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#### 14 - Transport Information

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#### RID/ADR

UN#: 1127  
Class: 3  
PG: II  
Proper Shipping Name: Chlorobutanes

#### IMDG

UN#: 1127  
Class: 3  
PG: II  
Proper Shipping Name: Chlorobutanes  
Marine Pollutant: No  
Severe Marine Pollutant: No

#### IATA

UN#: 1127  
Class: 3  
PG: II  
Proper Shipping Name: Chlorobutanes  
Inhalation Packing Group I: No

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#### 15 - Regulatory Information

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#### CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES

INDICATION OF DANGER: F  
Highly Flammable.  
R-PHRASES: 11  
Highly flammable.  
S-PHRASES: 7/9 16 29  
Keep container tightly closed and in well-ventilated place.  
Keep away from sources of ignition - no smoking. Do not empty into drains.

#### COUNTRY SPECIFIC INFORMATION

Germany  
WGK: 2 (self-classification)

SWITZERLAND  
SWISS POISON CLASS: 4

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## 16 - Other Information

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### WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2005 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

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