

## MATERIAL SAFETY DATA SHEET

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Version 1.5

## Section 1 - Product and Company Information

Product Name 2-BUTANONE, 99.5+%, HPLC GRADE  
Product Number 270695  
Brand ALDRICH

Company Sigma-Aldrich  
Street Address 3050 Spruce Street  
City, State, Zip, Country SAINT LOUIS MO 63103 US  
Technical Phone: 314 771 5765  
Emergency Phone: 414 273 3850 Ext. 5996  
Fax: 800 325 5052

## Section 2 - Composition/Information on Ingredient

| Substance Name | CAS #   | SARA 313 |
|----------------|---------|----------|
| 2-BUTANONE     | 78-93-3 | Yes      |

Formula C4H8O  
Synonyms Acetone, methyl- \* Aethylmethylketon (German) \*  
Butanone \* 2-Butanone (OSHA) \* Butanone 2  
(French) \* 3-Butanone \* Ethyl methyl cetone  
(French) \* Ethylmethylketon (Dutch) \* Ketone,  
ethyl methyl \* Meetco \* MEK (OSHA) \* Methyl  
acetone \* Methyl ethyl ketone (ACGIH:OSHA) \*  
Metiletilchetone (Italian) \* Metyloetyloketon  
(Polish) \* RCRA waste number U159

RTECS Number: EL6475000

## Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Irritant.  
Irritating to respiratory system and skin. Risk of serious damage  
to eyes. Vapors may cause drowsiness and dizziness.  
Target organ(s): Central nervous system.

## HMIS RATING

HEALTH: 2\*  
FLAMMABILITY: 3  
REACTIVITY: 1

## NFPA RATING

HEALTH: 2  
FLAMMABILITY: 3  
REACTIVITY: 1

\*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

## Section 4 - First Aid Measures

#### ORAL EXPOSURE

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

#### INHALATION EXPOSURE

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

#### DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

#### EYE EXPOSURE

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

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### Section 5 - Fire Fighting Measures

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#### FLAMMABLE HAZARDS

Flammable Hazards: Yes

#### EXPLOSION HAZARDS

Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions.

#### FLASH POINT

30 °F -1 °C Method: closed cup

#### EXPLOSION LIMITS

Lower: 1.8 % Upper: 10.1 %

#### AUTOIGNITION TEMP

516 °C

#### FLAMMABILITY

N/A

#### EXTINGUISHING MEDIA

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

#### FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.  
Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

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### Section 6 - Accidental Release Measures

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#### PROCEDURE 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 dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

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## Section 7 - Handling and Storage

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### HANDLING

User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

### STORAGE

Suitable: Keep tightly closed. Keep away from heat, sparks, and open flame. Store in a cool dry place. Store under nitrogen.

### SPECIAL REQUIREMENTS

Hygroscopic.

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## Section 8 - Exposure Controls / PPE

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### ENGINEERING CONTROLS

Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

### PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Government approved respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

### GENERAL HYGIENE MEASURES

Remove and wash contaminated clothing promptly. Wash thoroughly after handling.

### EXPOSURE LIMITS, RTECS

| Country                  | Source            | Type | Value                      |
|--------------------------|-------------------|------|----------------------------|
| USA                      | ACGIH             | STEL | 300 PPM                    |
| USA                      | ACGIH             | TWA  | 200 PPM                    |
| USA                      | MSHA Standard-air | TWA  | 200 PPM (590 MG/M3)        |
| USA                      | OSHA.             | PEL  | 8H TWA 200 PPM (590 MG/M3) |
| New Zealand OEL          |                   |      |                            |
| Remarks: check ACGIH TLV |                   |      |                            |
| USA                      | NIOSH             | TWA  | 200 PPM                    |
|                          |                   | STEL | 300 PPM                    |

### EXPOSURE LIMITS

| Country | Source | Type  | Value     |
|---------|--------|-------|-----------|
| Poland  |        | NDS   | 200 MG/M3 |
| Poland  |        | NDSch | 850 MG/M3 |
| Poland  |        | NDSP  | -         |

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## Section 9 - Physical/Chemical Properties

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|                       |                              |                            |
|-----------------------|------------------------------|----------------------------|
| Appearance            | Physical State: Clear liquid |                            |
|                       | Color: Colorless             |                            |
| Property              | Value                        | At Temperature or Pressure |
| Molecular Weight      | 72.11 AMU                    |                            |
| pH                    | N/A                          |                            |
| BP/BP Range           | 79 - 80 °C                   |                            |
| MP/MP Range           | -87 °C                       |                            |
| Freezing Point        | -85.9 °C                     |                            |
| Vapor Pressure        | 71 mmHg                      | 20 °C                      |
| Vapor Density         | 2.49 g/l                     |                            |
| Saturated Vapor Conc. | N/A                          |                            |
| SG/Density            | 0.804 g/cm3                  |                            |

|                       |   |                    |
|-----------------------|---|--------------------|
| Bulk Density          | N/A   |                    |
| Odor Threshold        | 5.4 - 1 ppm   |                    |
| Volatile%             | N/A   |                    |
| VOC Content           | N/A   |                    |
| Water Content         | N/A   |                    |
| Solvent Content       | N/A   |                    |
| Evaporation Rate      | N/A   |                    |
| Viscosity             | 0.4 Pas   | 25 °C              |
| Surface Tension       | 24.6 mN/m   | 20 °C              |
| Partition Coefficient | Log Kow: 0.29   |                    |
| Decomposition Temp.   | N/A   |                    |
| Flash Point           | 30 °F -1 °C   | Method: closed cup |
| Explosion Limits      | Lower: 1.8 %<br>Upper: 10.1 %   |                    |
| Flammability          | N/A   |                    |
| Autoignition Temp     | 516 °C  |                    |
| Refractive Index      | 1.379   |                    |
| Optical Rotation      | N/A   |                    |
| Miscellaneous Data    | N/A   |                    |
| Solubility            | Solubility in Water:soluble<br>Other Solvents: ALCOHOL, ETHER, ACETONE<br>BENZENE |                    |

N/A = not available

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## Section 10 - Stability and Reactivity

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### STABILITY

Stable: Stable.

Conditions to Avoid: Protect from moisture.

Materials to Avoid: Oxidizing agents, Strong reducing agents.

### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

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## Section 11 - Toxicological Information

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### ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes severe eye irritation.

Inhalation: Material is irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.

Ingestion: May be harmful if swallowed.

### TARGET ORGAN(S) OR SYSTEM(S)

Central nervous system.

### SIGNS AND SYMPTOMS OF EXPOSURE

Can cause CNS depression. Exposure can cause: Gastrointestinal disturbances. Narcotic effect.

### TOXICITY DATA

Oral

Rat

2737 mg/kg

LD50

Inhalation  
Rat  
23,500 mg/m<sup>3</sup>  
LC50

Intraperitoneal  
Rat  
607 MG/KG  
LD50

Oral  
Mouse  
4050 mg/kg  
LD50

Inhalation  
Mouse  
32,000 mg/m<sup>3</sup>  
LC50

Intraperitoneal  
Mouse  
616 MG/KG  
LD50

Skin  
Rabbit  
6480 mg/kg  
LD50

Inhalation  
Mammal  
38,000 mg/m<sup>3</sup>  
LC50

#### IRRITATION DATA

Eyes  
Human  
350 ppm

Skin  
Rabbit  
500 mg  
24H  
Remarks: Moderate irritation effect

Skin  
Rabbit  
402 mg  
24H  
Remarks: Mild irritation effect

Skin  
Rabbit  
13.78 mg  
24H  
Remarks: Open irritation test

Eyes  
Rabbit  
80 mg

## CHRONIC EXPOSURE - TERATOGEN

Species: Rat  
Dose: 3000 PPM/7H  
Route of Application: Inhalation  
Exposure Time: (6-15D PREG)  
Result: Specific Developmental Abnormalities: Craniofacial (including nose and tongue). Specific Developmental Abnormalities: Urogenital system. Specific Developmental Abnormalities: Homeostasis

Species: Rat  
Dose: 1000 PPM/7H  
Route of Application: Inhalation  
Exposure Time: (6-15D PREG)  
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Mouse  
Dose: 3000 PPM/7H  
Route of Application: Inhalation  
Exposure Time: (6-15D PREG)  
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

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## Section 12 - Ecological Information

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### ACUTE ECOTOXICITY TESTS

Test Type: EC50 Daphnia  
Species: Daphnia magna  
Time: 24 h  
Value: 7,060 mg/l

Test Type: LC50 Fish  
Species: Leuciscus idus  
Time: 48 h  
Value: 4,600 - 4,880 mg/l

Test Type: LC50 Fish  
Species: Pimephales promelas (Fathead minnow)  
Time: 96 h  
Value: 3,130 - 3,320 mg/l

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## Section 13 - Disposal Considerations

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### APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. 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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## Section 14 - Transport Information

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### DOT

Proper Shipping Name: Ethyl methyl ketone [or] Methyl ethyl ketone  
UN#: 1193  
Class: 3

Packing Group: Packing Group II  
Hazard Label: Flammable liquid  
PIH: Not PIH

#### IATA

Proper Shipping Name: Methyl ethyl ketone  
IATA UN Number: 1193  
Hazard Class: 3  
Packing Group: II

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#### Section 15 - Regulatory Information

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##### EU DIRECTIVES CLASSIFICATION

Symbol of Danger: F Xi  
Indication of Danger: Highly Flammable. Irritant.  
R: 11 36 66 67  
Risk Statements: Highly flammable. Irritating to eyes. Repeated exposure may cause skin dryness or cracking. Vapors may cause drowsiness and dizziness.  
S: 9 16  
Safety Statements: Keep container in a well-ventilated place. Keep away from sources of ignition - no smoking.

##### US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Flammable (USA) Highly Flammable (EU). Irritant.  
Risk Statements: Irritating to respiratory system and skin. Risk of serious damage to eyes. Vapors may cause drowsiness and dizziness.  
Safety Statements: Keep away from sources of ignition - no smoking. Take precautionary measures against static discharges. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.  
US Statements: Target organ(s): Central nervous system.

##### UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes  
DEMINIMIS: 1 %  
NOTES: This product is subject to SARA section 313 reporting requirements.  
TSCA INVENTORY ITEM: Yes

##### CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.  
DSL: Yes  
NDSL: No

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#### Section 16 - Other Information

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##### DISCLAIMER

For R&D use only. Not for drug, household or other uses.

##### 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

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