

## MATERIAL SAFETY DATA SHEET

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Version 1.5

## Section 1 - Product and Company Information

Product Name	4-METHYL-2-PENTANONE, 99+%
Product Number	537713
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
4-METHYL-2-PENTANONE	108-10-1	Yes
Formula	C6H12O	
Synonyms	Hexon (Czech) * Hexone (OSHA) * Isobutyl-methylketon (Czech) * Isobutyl methyl ketone * Isopropylacetone * Ketone, isobutyl methyl * Methyl-isobutyl-cetone (French) * Methylisobutylketon (Dutch, German) * Methyl isobutyl ketone (ACGIH:OSHA) * Metyloizobutyloketon (Polish) * 4-Methyl-pentan-2-on (Dutch, German) * 2-Methyl-4-pentanone * 4-Methyl-2-pentanone (Czech) * 4-Methyl-2-pentanone * Metilisobutilchetone (Italian) * 4-Metilpentan-2-one (Italian) * MIBK * MIK * RCRA waste number U161 * Shell MIBK	
RTECS Number:	SA9275000	

## Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Irritant.  
Irritating to eyes, respiratory system and skin.  
Target organ(s): Nerves.

## HMIS RATING

HEALTH: 2  
FLAMMABILITY: 3  
REACTIVITY: 0

## NFPA RATING

HEALTH: 2  
FLAMMABILITY: 3  
REACTIVITY: 0

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

## Section 4 - First Aid Measures

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### 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. Forms explosive mixtures in air.

### FLASH POINT

57.2 °F 14 °C Method: closed cup

### EXPLOSION LIMITS

Lower: 1.2 % Upper: 8 %

### AUTOIGNITION TEMP

459 °C

### FLAMMABILITY

N/A

### EXTINGUISHING MEDIA

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

Unsuitable: Water may be effective for cooling, but may not effect extinguishment.

### FIREFIGHTING

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

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

Specific Method(s) of Fire Fighting: Use water spray to cool fire-exposed containers.

### EXPOSURE HAZARD(S)

Material: Harmful liquid. Irritant.

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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.

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

Wear respirator, chemical safety goggles, 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: Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

### STORAGE

Suitable: Keep container closed. Keep away from heat, sparks, and open flame.

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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

Wash thoroughly after handling. Wash contaminated clothing before reuse.

### EXPOSURE LIMITS, RTECS

Country	Source	Type	Value
USA	ACGIH	STEL	75 PPM
USA	ACGIH	TWA	50 PPM
USA	MSHA Standard-air	TWA	100 PPM (410 MG/M3)
USA	OSHA.	PEL	8H TWA 100 PPM (410 MG/M3)
USA	NIOSH	TWA	50 PPM
		STEL	75 PPM

### EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	83
Poland		NDSch	200
Poland		NDSP	-

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## Section 9 - Physical/Chemical Properties

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Appearance	Physical State: Liquid		
Property	Value	At Temperature or Pressure	
Molecular Weight	100.16 AMU		
pH	N/A		
BP/BP Range	115 - 117 °C		
MP/MP Range	-80 °C		
Freezing Point	N/A		

Vapor Pressure	15 mmHg	20 °C
Vapor Density	3.5 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0.8 g/cm3	
Bulk Density	N/A	
Odor Threshold	0.1 ppm	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	23.6 mN/m	20 °C
Partition Coefficient	N/A Log Kow: 1.31	
Decomposition Temp.	N/A	
Flash Point	57.2 °F 14 °C	Method: closed cup
Explosion Limits	Lower: 1.2 % Upper: 8 %	
Flammability	N/A	
Autoignition Temp	459 °C	
Refractive Index	1.396	
Optical Rotation	N/A	
Miscellaneous Data	N/A	
Solubility	Solubility in Water: 20 mg/ml H2O Other Solvents: SOLUBLE IN ALCOHOL, ETHER ACETONE, BENZENE CHLOR	

N/A = not available

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## Section 10 - Stability and Reactivity

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### STABILITY

Stable: Stable.

Materials to Avoid: Oxidizing agents, Strong bases.

### 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 eye irritation.

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

Ingestion: May be harmful if swallowed.

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

Nerves.

### SIGNS AND SYMPTOMS OF EXPOSURE

Contact with eyes can cause redness, tearing, and blurred vision. Prolonged or repeated contact with skin can cause defatting and dermatitis. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

### TOXICITY DATA

Oral  
Rat  
2080 mg/kg  
LD50

Inhalation  
Rat  
100,000 mg/m<sup>3</sup>  
LC50

Intraperitoneal  
Rat  
400 MG/KG  
LD50

Oral  
Mouse  
1900 mg/kg  
LD50

Inhalation  
Mouse  
23,300 mg/m<sup>3</sup>  
LC50

Intraperitoneal  
Mouse  
268 MG/KG  
LD50

Oral  
Guinea pig  
1600 mg/kg  
LD50

Intraperitoneal  
Guinea pig  
800 MG/KG  
LD50

#### IRRITATION DATA

Eyes  
Human  
200 ppm  
15M

Skin  
Rabbit  
500 mg  
24H  
Remarks: Mild irritation effect

Eyes  
Rabbit  
40 mg  
Remarks: Severe irritation effect

Eyes  
Rabbit  
0.1 ml

24H  
Remarks: Moderate irritation effect

#### CHRONIC EXPOSURE - TERATOGEN

Species: Rat  
Dose: 300 PPM/6H  
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/6H  
Route of Application: Inhalation  
Exposure Time: (6-15D PREG)  
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Species: Mouse  
Dose: 3000 PPM/6H  
Route of Application: Inhalation  
Exposure Time: (6-15D PREG)  
Result: Specific Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

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#### Section 12 - Ecological Information

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##### ACUTE ECOTOXICITY TESTS

Test Type: EC50 Algae  
Species: Scenedesmus subspicatus  
Time: 48 h  
Value: 980 - 2,000 mg/l

Test Type: EC50 Daphnia  
Species: Daphnia magna  
Time: 24 h  
Value: 1,550 - 3,623 mg/l

Test Type: LC50 Fish  
Species: Leuciscus idus  
Time: 48 h  
Value: 672 - 744 mg/l

Test Type: LC50 Fish  
Species: Pimephales promelas (Fathead minnow)  
Time: 96 h  
Value: 496 - 593 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: Methyl isobutyl ketone  
UN#: 1245  
Class: 3  
Packing Group: Packing Group II  
Hazard Label: Flammable liquid  
PIH: Not PIH

### IATA

Proper Shipping Name: Methyl isobutyl ketone  
IATA UN Number: 1245  
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 Xn  
Indication of Danger: Highly Flammable. Harmful.  
R: 11 20 36/37 66  
Risk Statements: Highly flammable. Harmful by inhalation.  
Irritating to eyes and respiratory system. Repeated exposure may cause skin dryness or cracking.  
S: 9 16 29  
Safety Statements: Keep container in a well-ventilated place.  
Keep away from sources of ignition - no smoking. Do not empty into drains.

### US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Flammable (USA) Highly Flammable (EU).  
Irritant.  
Risk Statements: Irritating to eyes, respiratory system and skin.  
Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Take precautionary measures against static discharges. Wear suitable protective clothing.  
US Statements: Target organ(s): Nerves.

### 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 from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2004 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.