

METHYL ISOBUTYL KETONE

Chemical Name	CAS-No.	Wt/Wt	GHS Classification**
2-Pentanone, 4-methyl-	108-10-1	> 99 %	H225, H332, H335, H336, H320

**For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1. Description of necessary first-aid measures:

Inhalation:

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

Skin:

In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eyes:

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

Ingestion:

If swallowed, DO NOT induce vomiting. Get medical attention. Never give anything by mouth to an unconscious person.

4.2. Most important symptoms/effects, acute and delayed:

For most important symptoms and effects (acute and delayed), see Section 2 (Hazard Statements and Supplemental Information) and Section 11 (Toxicology Information) of this SDS.

4.3. Indication of immediate medical attention and special treatment needed, if necessary:

Unless otherwise noted in Notes to Physician, no specific treatment noted; treat symptomatically.

5. FIREFIGHTING MEASURES

Extinguishing media (suitable):

Water spray, Foam, Dry chemical, Carbon dioxide (CO₂)

Extinguishing media (unsuitable):

High volume water jet

Protective equipment:

Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand / NIOSH approved or equivalent).

Fire fighting equipment should be thoroughly decontaminated after use.

Further firefighting advice:

Cool closed containers exposed to fire with water spray.

Vapors are heavier than air and may travel along the ground or be moved by ventilation and ignited by heat, pilot lights, and other flames and ignition sources at locations distant from material handling point.

Do not use a solid water stream as it may scatter and spread fire.

Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material.

To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient.

Review all operations, which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures.

Fire and explosion hazards:

When burned, the following hazardous products of combustion can occur:

Carbon oxides

Hazardous organic compounds

Special Engineering Controls: To minimize static charge accumulation, flow rate should be restricted to less than or equal to 10 m/s (32.8 ft/s). When adding product to a hot reactor, closed system addition is recommended due to product volatility and flammability.

6. ACCIDENTAL RELEASE MEASURES**Personal precautions, Emergency procedures, Methods and materials for containment/clean-up:**

Prevent further leakage or spillage if you can do so without risk. Evacuate area of all unnecessary personnel.

Ventilate the area. Eliminate all ignition sources. Avoid generation of vapors. Contain and collect spillage with non-combustible absorbent material such as sodium bicarbonate, sodium carbonate, calcium carbonate, clean sand or non-acidic clay and then wet down (dampen) the mixture with water. Sweep or scoop up using non-sparking tools and place into suitable properly labeled containers for prompt disposal. The sweepings should be wetted down further with water. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

Protective equipment:

Appropriate personal protective equipment is set forth in Section 8.

7. HANDLING AND STORAGE

Handling

General information on handling:

Keep away from heat, sparks and flames.
 Eliminate sources of ignition.
 Avoid spark promoters.
 These alone may be insufficient to remove static electricity.
 Do not taste or swallow.
 Avoid breathing vapor or mist.
 Avoid contact with the skin, eyes and clothing.
 Keep container closed.
 Use only with adequate ventilation.
 Wash thoroughly after handling.
 Do not use air for transfers.
 Do not use air to dry the equipment.
 Emptied container retains vapor and product residue.
 Check that all equipment is properly grounded and installed to satisfy electrical classification requirements.
DO NOT CUT, DRILL, GRIND, OR WELD ON OR NEAR THIS CONTAINER.
RESIDUAL VAPORS MAY EXPLODE ON IGNITION.
 Follow label warnings even after container is emptied.
 Container hazardous when empty.
 Improper disposal or reuse of this container may be dangerous and/or illegal.

Storage

General information on storage conditions:

Store in well ventilated area away from heat, direct sunlight and sources of ignition such as flame, sparks and static electricity. Ensure that all storage and handling equipment is properly grounded and installed to satisfy electrical classification requirements. Static electricity may accumulate when transferring material. All metal and groundable storage containers, including but not limited to drums, cylinders, Returnable Intermodal Bulk Containers (RIBCs) and Class C Flexible Intermodal Bulk Containers (FIBCs) must be bonded and grounded during filling and emptying operations. Observe all federal, state and local regulations and National Fire Protection Association (NFPA) Codes which pertain to the specific local conditions of storage and use, including OSHA 29 CFR 1910.106 and NFPA 30, 70, 77, and 497. May form explosive peroxide on standing for a prolonged period in air.

Storage incompatibility – General:

Store separate from: Strong oxidizing agents

Hydrogen peroxide

Ozone

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Airborne Exposure Guidelines:

2-Pentanone, 4-methyl- (108-10-1)

US. ACGIH Threshold Limit Values

Time weighted average	20 ppm
Short Term Exposure Limit (STEL):	75 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

PEL: 100 ppm (410 mg/m³)

Only those components with exposure limits are printed in this section. Limits with skin contact designation above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required. Limits with a sensitizer designation above mean that exposure to this material may cause allergic reactions.

Engineering controls:

Investigate engineering techniques to reduce exposures below airborne exposure limits or to otherwise reduce exposures. Provide ventilation if necessary to minimize exposures or to control exposure levels to below airborne exposure limits (if applicable see above). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Consult ACGIH ventilation manual or NFPA Standard 91 for design of exhaust systems.

Respiratory protection:

Avoid breathing vapor or mist. Where airborne exposure is likely or airborne exposure limits are exceeded (if applicable, see above), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Full facepiece equipment is recommended and, if used, replaces need for face shield and/or chemical goggles. Consult respirator manufacturer to determine appropriate type equipment for a given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where there may be a potential for significant exposure or where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Skin protection:

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Wear face shield and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse immediately if skin is contaminated. Wash contaminated clothing and clean protective equipment before reuse. Wash thoroughly after handling.

Eye protection:

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment immediately available.

9. PHYSICAL AND CHEMICAL PROPERTIES
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Color:	Clear - colourless
Physical state:	liquid
Odor:	sweet
Odor threshold:	0.04 - 0.08 ppm
Flash point	59 - 73 °F (15 - 23 °C) (closed cup)

Auto-ignition temperature:	838 - 860 °F (448 - 460 °C)
Lower flammable limit (LFL):	1.4 %(V)
Upper flammable limit (UFL):	7.5 %(V)
pH:	not determined
Density:	800 kg/m ³ (68 °F (20 °C))
Specific Gravity (Relative density):	0.8 (68 °F(20 °C))Water=1 (liquid)
Vapor pressure:	16 mmHg (68 °F (20 °C))
Vapor density:	4.46 kg/m ³ (68 °F (20 °C))
Boiling point/boiling range:	241 - 244 °F (116 - 118 °C)
Start of distillation:	239 °F (115 °C)
Melting point/range:	No data available.
Freezing point:	No data available.
Evaporation rate:	No data available
Solubility in water:	14.1 g/l 5.4 68 °F (20 °C) Solubility of water in the product
Solubility in other solvents: [qualitative and quantative]	miscible with most organic solvents
Viscosity, dynamic:	0.585 mPa.s 68 °F (20 °C) 0.545 mPa.s 77 °F (25 °C) 0.522 mPa.s 86 °F (30 °C) 0.406 mPa.s 122 °F (50 °C)
Oil/water partition coefficient:	No data available
Thermal decomposition	No data available
Flammability:	See GHS Classification in Section 2

10. STABILITY AND REACTIVITY**Stability:**

This material is chemically stable under normal and anticipated storage, handling and processing conditions.

Hazardous reactions:

None known.

Materials to avoid:

Hydrogen peroxide
(formation of unstable peroxides)

Ozone

Reacts violently with:

Strong oxidizing agents

Conditions / hazards to avoid:

Keep away from heat and sources of ignition. May form explosive peroxide on standing for a prolonged period in air.

Hazardous decomposition products:

Thermal decomposition giving flammable and toxic products :

Carbon oxides

Hazardous organic vapors

11. TOXICOLOGICAL INFORMATION**Data for METHYL ISOBUTYL KETONE****Acute toxicity****Oral:**

May be harmful if swallowed. (Rat) LD50 = 2,080 - 4,600 mg/kg.

Dermal:

No deaths occurred. (Rabbit) LD0 > 2,000 mg/kg.

Inhalation:

Harmful if inhaled. (Rat) 4 h LC50 > 8.2 - 16.4 mg/l. (vapor)

Signs/effects reported after acute exposure (laboratory animal) signs: anesthetic effects, irritation

Specific target organ toxicity - single exposure:

May cause respiratory irritation.

May cause drowsiness or dizziness.

Skin Irritation:

Not irritating. (Rabbit) Irritation Index: 0/8. (4 h)

Eye Irritation:

Causes eye irritation. (Rabbit) Irritation Index: 0.0 - 8.4/110.

Skin Sensitization:

Not a sensitizer. Guinea pig maximization test. No skin allergy was observed

Repeated dose toxicity

Subchronic inhalation administration to rat, mouse, dog / No adverse systemic effects reported.

Subchronic inhalation administration to hens / signs: limb weakness

Chronic inhalation administration to Rat / affected organ(s): kidney / signs: changes in organ structure or function, hyaline droplet nephropathy

Chronic inhalation administration to Mouse / affected organ(s): liver / signs: changes in organ structure or function

Subchronic oral administration to Rat / affected organ(s): kidney, liver / signs: changes in organ weights, changes in organ structure or function, clinical chemistry changes

Subchronic dermal administration to Guinea pig / signs: Local irritation / No adverse systemic effects reported.

Carcinogenicity

Chronic Inhalation administration to Mouse / affected organ(s): liver / signs: Increased incidence of tumors was reported.

Chronic inhalation administration to male rat / affected organ(s): kidney / signs: Increased incidence of tumors was reported. / (not considered relevant to humans)

Classified by the International Agency for Research on Cancer as: Group 2B: Possibly carcinogenic to humans.

Genotoxicity**Assessment in Vitro:**

No genetic changes were observed in laboratory tests using: bacteria, animal cells, yeast

Assessment in Vivo:

No genetic changes were observed in laboratory tests using: mice

Developmental toxicity

Exposure during pregnancy. inhalation (rat and mouse) / No birth defects were observed. (levels produced toxic effects in the mothers and offspring)

Reproductive effects

Two generation reproduction study. Inhalation (Rat) / No toxicity to reproduction. / (toxic effects also observed in the parental animals at these doses)

Other information

Solvents may degrease the skin.

Aspiration hazard

May be harmful if swallowed and enters airways.

Human experience**Inhalation:**

Exposures exceeded recommended occupational exposure limit.

Central nervous system: dizziness, drowsiness, headache, nausea. (based on reports of occupational exposure to workers)

Respiratory tract: irritation. (based on reports of occupational exposure to workers)

Skin contact:

Prolonged skin contact may defat the skin and produce dermatitis.

Skin: cracking, itching, redness.

Eye contact:

Exposures exceeded recommended occupational exposure limit.

Eyes: blurred vision, irritating, stinging. (vapor)

12. ECOLOGICAL INFORMATION**Chemical Fate and Pathway**

Data on this material and/or a similar material are summarized below.

Data for METHYL ISOBUTYL KETONE**Biodegradation:**

Readily biodegradable. (28 d) biodegradation 83 %

Biological Oxygen Demand:

5 d BOD = 76% ThOD(activated sludge)

Octanol Water Partition Coefficient:

log Pow = 1.9

Ecotoxicology

Data on this material and/or a similar material are summarized below.

Data for METHYL ISOBUTYL KETONE**Aquatic toxicity data:**

Practically nontoxic. Danio rerio (zebra fish) 96 h LC50 > 179 mg/l

Practically nontoxic. Pimephales promelas (fathead minnow) 96 h LC50 between 509 - 780 mg/l

Practically nontoxic. Oncorhynchus mykiss (rainbow trout) 96 h LC50 = 600 mg/l

Aquatic invertebrates:

Practically nontoxic. Daphnia magna (Water flea) 48 h EC50 = 170 mg/l

Algae:

Practically nontoxic. Selenastrum capricornutum (green algae) 96 h EC50 = 400 mg/l

Practically nontoxic. Scenedesmus subspicatus 48 h LC50 = 980 mg/l

Microorganisms:

Pseudomonas putida 16 h EC50 = 275 mg/l

Chronic toxicity to aquatic invertebrates:

Practically nontoxic. Daphnia magna (Water flea) 21 d NOEC (Reproduction inhibition) = 30 - 35 mg/l

Chronic toxicity to aquatic plants:

Practically nontoxic. Lemna gibba 7 d NOEC r (Growth inhibition) > 146 mg/l

13. DISPOSAL CONSIDERATIONS

Waste disposal:

Disposal via incineration is recommended. Dispose of in accordance with federal, state and local regulations. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

14. TRANSPORT INFORMATION

US Department of Transportation (DOT)

UN Number : 1245
 Proper shipping name : Methyl isobutyl ketone
 Class : 3
 Packaging group : II
 Marine pollutant : no
 Reportable quantity : 5000 lbs (Methyl Isobutyl Ketone)

International Maritime Dangerous Goods Code (IMDG)

UN Number : 1245
 Proper shipping name : METHYL ISOBUTYL KETONE
 Class : 3
 Packaging group : II
 Marine pollutant : no
 Flash point : 59 - 73 °F (15 - 23 °C) closed cup

15. REGULATORY INFORMATION

Chemical Inventory Status

EU. EINECS	EINECS	Conforms to
United States TSCA Inventory	TSCA	The components of this product are all on the TSCA Inventory.
Canadian Domestic Substances List (DSL)	DSL	All components of this product are on the Canadian DSL
China. Inventory of Existing Chemical Substances in China (IECSC)	IECSC (CN)	Conforms to
Japan. ENCS - Existing and New Chemical Substances Inventory	ENCS (JP)	Conforms to
Japan. ISHL - Inventory of Chemical Substances	ISHL (JP)	Conforms to

Korea. Korean Existing Chemicals Inventory (KECI)	KECI (KR)	Conforms to
Philippines Inventory of Chemicals and Chemical Substances (PICCS)	PICCS (PH)	Conforms to
Australia Inventory of Chemical Substances (AICS)	AICS	Conforms to

United States – Federal Regulations

SARA Title III – Section 302 Extremely Hazardous Chemicals:

The components in this product are either not SARA Section 302 regulated or regulated but present in negligible concentrations.

SARA Title III - Section 311/312 Hazard Categories:

Acute Health Hazard, Fire Hazard

SARA Title III – Section 313 Toxic Chemicals:

The following components are subject to reporting levels established by SARA Title III, Section 313:

<u>Chemical name</u>	<u>CAS-No.</u>	<u>De minimis concentration</u>	<u>Reportable threshold:</u>
2-Pentanone, 4-methyl-	108-10-1	1.0 %	25000 lbs (Manufacturing and processing) 10000 lbs (Otherwise used (non-manufacturing/processing))

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) - Reportable Quantity (RQ):

<u>Chemical name</u>	<u>CAS-No.</u>	<u>Reportable quantity</u>
2-Pentanone, 4-methyl-	108-10-1	5000 lbs

United States – State Regulations

New Jersey Right to Know

<u>Chemical name</u>	<u>CAS-No.</u>
2-Pentanone, 4-methyl-	108-10-1

New Jersey Right to Know – Special Health Hazard Substance(s)

<u>Chemical name</u>	<u>CAS-No.</u>
2-Pentanone, 4-methyl-	108-10-1

Pennsylvania Right to Know

<u>Chemical name</u>	<u>CAS-No.</u>
2-Pentanone, 4-methyl-	108-10-1

Pennsylvania Right to Know – Environmentally Hazardous Substance(s)

<u>Chemical name</u>	<u>CAS-No.</u>
2-Pentanone, 4-methyl-	108-10-1

California Prop. 65

WARNING! This product contains a chemical known to the State of California to cause cancer.

<u>Chemical name</u>	<u>CAS-No.</u>
2-Pentanone, 4-methyl-	108-10-1

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapour.
H320	Causes eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H335 + H336	May cause respiratory irritation, and drowsiness or dizziness.
H336	May cause drowsiness or dizziness.

Miscellaneous:

Other information:	Refer to National Fire Protection Association (NFPA) Codes 30, 70, 77, and 497 and OSHA 29 CFR 1910.106, for safe handling.
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Latest Revision(s):

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