



Product name:	Methyl ethyl ketone
MSDS number:	61
Material number:	80061
Published date:	06/10/2004

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Product: Methyl ethyl ketone

MSDS number: 61
Material number: 80061

Manufacturer name and address:

Celanese Ltd.
 1601 W. LBJ Freeway
 P.O. Box 819005
 Dallas, TX 75381-9005
 United States
 Phone: 972 443 4000
 Internet: www.celanesechemicals.us

Celanese Mexicana, S.A. de C.V.
 Tecoyotitla # 412
 ExHacienda de Guadalupe Chimalistac
 Alvaro Obregón CP 01050
 México,D.F.
 Phone: (55) 54-80-9100

Celanese Canada, Inc.
 P.O. Box 99 Station Main
 Edmonton, Alberta,
 Canada T5J 2H7

Transportation emergency phone numbers:

In USA, call 800 424 9300
 Outside USA, call 703 527 3887, collect calls accepted
 In Mexico, call 8700 0021400 / (55) 55 59 1588.

Product Use: Solvent for paints and coatings, adhesives, magnetic tape production, lube oil de-waxing, printing; miscellaneous uses.

2. Composition / Information on Ingredients

Component	CAS Number	Percent %	OSHA hazard category:
METHYL ETHYL KETONE	78-93-3	99.5	Hazardous

3. Hazards Identification

Transportation emergency: 800 424 9300 CHEMTREC, 24 hrs/day
 703 527 3887 Outside USA, collect calls accepted, 24 hrs/day 800-0021400 / (55) 55-59-1588 In Mexico, SETIQ, 24 hrs/day

Product emergency: 800 835 5235 Celanese, 24 hrs/day

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Emergency Overview:

DANGER!

- Extremely flammable liquid and vapor. Vapor may cause flash fire.
- Causes eye irritation.
- May cause respiratory tract irritation.
- May cause skin irritation.
- Vapor is heavier than air and can travel considerable distance to a source of ignition and flashback.

Product Description

Appearance: Clear, colorless, oily liquid.
Odor: Strong characteristic "ketone" odor.

Potential health effects

Routes of exposure: Skin, eyes, inhalation, ingestion.

Immediate effects:

Skin: May cause skin irritation. Symptoms of exposure may include: Drying, cracking or inflammation of skin.

Eyes: Exposure to vapors and liquid Causes eye irritation. Symptoms of exposure may include: Eye irritation, burning sensation, pain, watering, and/or change of vision.

Inhalation: May cause respiratory tract irritation. Symptoms of exposure may include: Central nervous system depression with nausea, dizziness, headache, stupor, uncoordinated or strange behavior or unconsciousness. Nasal discharge, hoarseness, coughing, chest pain and breathing difficulty.

Ingestion: Essentially non-toxic. Symptoms of exposure may include: Nausea, vomiting, loss of appetite, gastrointestinal irritation and/or diarrhea. Central nervous system depression with nausea, headache and mental sluggishness.

Reproductive: No evidence of reproductive effects.

Carcinogenic: No evidence of carcinogenicity.

Mutagenic: Does not show mutagenic potential in Ames test. Does not show mutagenic potential in most in vitro tests.

Teratogenic: No evidence of birth defects.

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Target organ effects: •Overexposure (prolonged or repeated exposure) may cause:
Central nervous system depression
Injury to the eyes
Irritation of the respiratory tract
Skin damage.

Medical conditions which may be aggravated by exposure: Significant exposure to this chemical may adversely affect people with acute or chronic disease of the:
Respiratory Tract
Skin
Eyes
Central nervous system

For further information, see: Section 4 - First Aid Measures
Section 5 - Fire Fighting Measures
Section 6 - Accidental Release Measures
Section 8 - Exposure Controls/Personal Protection
Section 9 - Physical and Chemical Properties
Section 10 - Stability and Reactivity

4. First Aid Measures

Skin: Immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Call a physician if irritation develops and persists. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lenses, if worn. Get medical attention immediately.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion: If large quantities of this material are swallowed, call a physician immediately. Do NOT induce vomiting unless directed to do so by a physician. Never give anything by mouth to an unconscious person. Call a physician.

5. Fire Fighting Measures

NFPA: Health: 1 Flammability: 3 Reactivity: 0

Flammable properties

Flash point (test method): -9 C (16 F) (Closed Cup)

Flammable limits in air, % by volume:

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Upper:	10 %
Lower:	1.8 %

Autoignition temperature: 404 C (759 F)

Products of combustion: Carbon Monoxide.

Extinguishing Media: Use alcohol type aqueous film forming foam for large fires. Use CO₂ or dry chemical for small fires.

Fire Fighting Instructions: Water may be ineffective but should be used to cool fire-exposed structures and vessels. Use water spray for large fires. Water spray can be used to reduce the intensity of flames and to dilute spills to a non-flammable mixture. Keep personnel removed from and upwind of fire. If potential for exposure to vapors or products of combustion exists, wear full fire fighting turnout gear and NIOSH approved self-contained breathing apparatus. Oxidizing chemicals may accelerate the burning rate in a fire situation. Vapor is heavier than air and can travel considerable distance to a source of ignition and flashback.

Fire Fighting Environmental Concerns: Vapors and combustion gases can be controlled using a water fog stream. Thoroughly decontaminate bunker gear and other fire-fighting equipment before re-use.

6. Accidental Release Measures

Spill or Leak Instructions

Eliminate ignition sources. See Section 8 for appropriate personal protective equipment. Contain spill with dikes of soil or nonflammable absorbent to minimize contaminated area. Water fog stream may reduce vapors. If fire potential exists, blanket spill with alcohol type aqueous film-forming foam or use water fog stream to disperse vapors. Avoid run-off into storm sewers and ditches leading to waterways. If required, notify state and local authorities. Place leaking containers in well-ventilated area. Clean up small spills by using a nonflammable absorbent or flushing sparingly with water. Contain larger spills with nonflammable diking or absorbent. Clean up by vacuuming or sweeping.

Within the United States, call the National Response Center (800-424-8802) and appropriate state and local authorities if the quantity released over 24 hours is equal to or greater than the reportable quantity listed below: par 5,000 lbs. of the material as is, based on a Reportable Quantity of 5,000 lbs. for methyl ethyl ketone.

Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. Isolate for 800 meters or 0.5 miles in all directions if tank, rail car, or tank truck is involved in fire. Evacuate downwind areas as conditions warrant to prevent exposure and to allow vapors or fumes to dissipate. Spills may expose downwind areas to toxic or flammable concentrations over considerable distances in some cases.

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7. Handling and Storage

Handling: Use with adequate ventilation. Keep containers closed when not in use. Always open containers slowly to allow any excess pressure to vent. Avoid breathing vapor. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Decontaminate soiled clothing thoroughly before re-use. Destroy contaminated leather clothing.

This product may generate a static charge. Ground/bond equipment when transferring material to prevent static accumulation. Electrical equipment and circuits in all storage and handling must conform to requirements of National Electric Code (Article 500 and 501) for hazardous location.

Storage: Keep all containers tightly closed when not in use. Store out of direct sunlight and on an impermeable floor.
Do not store with incompatible materials. See Section 10. Stability and Reactivity.

8. Exposure Controls / Personal Protection

Engineering Controls: General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Protective Equipment A safety shower and eyebath should be readily available.

Skin protection: Wear impervious clothing and gloves to prevent contact. Butyl rubber is recommended. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

Eye/face protection: Wear chemical goggles when there is a reasonable chance of eye contact.

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Respiratory protection: Based on workplace contaminant level and working limits of the respirator, use a respirator approved by NIOSH. The following is the minimum recommended equipment for an occupational exposure level. To estimate an occupational exposure level see Section 3, Section 8 and Section 11.

For concentrations > 1 and < 10 times the occupational exposure level: Use air-purifying respirator with full facepiece and organic vapor cartridge(s) or air-purifying full facepiece respirator with an organic vapor canister or a full facepiece powered *air-purifying respirator fitted with organic vapor cartridge(s)*. The air purifying element must have an end of service life indicator, or a documented change out schedule must be established. Otherwise, use supplied air.

For concentrations more than 10 times the occupational exposure level and less than the lower of either 100 times the occupational exposure level or the IDLH: Use Type C full facepiece supplied-air respirator operated in positive-pressure or continuous-flow mode.

For concentrations > 100 times the occupational exposure level or greater than the IDLH level or unknown concentrations (such as in emergencies): Use self-contained breathing apparatus with full facepiece in positive-pressure mode or Type C *positive-pressure full facepiece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus escape system*.

For escape: Use self-contained breathing apparatus with full facepiece or any respirator specifically approved for escape.

Exposure guidelines

Component	CAS Number	Percent %	ACGIH TWA	ACGIH STEL	ACGIH CEILING	OSHA TWA	OSHA STEL	OSHA CEILING	Celanese WEL *	Mexico TWA	Mexico STEL	Mexico CEILING
METHYL ETHYL KETONE	78-93-3	99.5	200 ppm	300 ppm	-	200 ppm	-	-	-	200 ppm	300 ppm	-

Component	CAS Number	Percent %	1990 NIOSH IDLH (Recognized by OSHA)	1994 NIOSH IDLH
METHYL ETHYL KETONE	78-93-3	99.5	3000 PPM	3000 ppm

Comments: Celanese has adopted the ACGIH TLVs
* Workplace Exposure Limit

9. Physical and Chemical Properties

Appearance: Clear, colorless, oily liquid.

Odor: Strong characteristic "ketone" odor.

Vapor Pressure: 91 mm Hg @ 25 deg C

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Vapor Density (Air=1 @ 20°C):	2.41
Boiling Point (760 mmHgA):	79.6 C (175.3 F)
Freezing Point:	-86.7 C (-124.1 F)
Solubility in Water @ 20°C:	26.8 %
Specific Gravity:	0.805 at 20 deg C
Molecular Weight:	72.11
Evaporation Rate (n-Butyl acetate = 1):	3.3

10. Stability and Reactivity

Stability:	Stable.
Conditions to Avoid:	Avoid heat , flames, sparks, and other sources of ignition.
Incompatibility:	Keep away from caustic soda, lime and other strong alkalis, hydrochloric, sulfuric and other strong inorganic acids, amines and oxidizing agents such as peroxides, nitric acid, perchloric acid, chromic acid, chromium trioxide, copper or copper alloys or pyridines.
Hazardous Combustion or Decomposition Products:	Thermal decomposition products may include oxides of carbon.
Hazardous Polymerization:	Hazardous polymerization will not occur.

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11. Toxicological Information

Component Toxicological Information

Component	METHYL ETHYL KETONE
	<p>Acute Exposure: Excessive exposure to MEK leads to depression of the central nervous system, shown by loss of coordination, reflexes and consciousness.</p> <p>Oral: Slightly toxic; oral LD50 (rat) = 2.7-5.6 g/kg .</p> <p>Inhalation: Slightly toxic; inhalation LC50 (rat) is estimated to be > 5000 ppm for a 6 hr. vapor exposure based on the lack of mortality in a repeated exposure study at this level. Other earlier studies exist, but do not meet current scientific guidelines. Causes irritation of the nasal passages and throat.</p> <p>Skin: Slightly toxic; Dermal LD50 (rabbit) = 5.0 - 13 g/kg. Can cause mild to moderate skin irritation (reddening and swelling). Repeated or prolonged contact can cause drying of the skin and dermatitis. Not a skin sensitizer based on human patch test.</p> <p>Eye: Liquid and vapor can cause severe eye irritation.</p>

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Mutagenicity: MEK has been shown to be without genotoxic activity in a variety of in vitro and in vivo tests. Among the tests which produced negative results are assays for point mutation (e.g., Ames test and mouse lymphoma), chromosomal aberration (rat liver cells in vitro and mouse bone marrow in vivo), DNA damage (unscheduled DNA synthesis in rat hepatocytes), and morphologic transformation (BALB 3T3 morphologic transformation assay). There was some evidence that MEK induced aneuploidy in yeast, but this does not appear to be biologically important since negative results were obtained in a mouse micronucleus test.

Carcinogenicity: No toxicologic studies. Not listed by IARC, NTP or OSHA.

Reproductive/Developmental Effects: No human studies have been reported. An initial inhalation study with rats indicated fetotoxicity (e.g., delayed fetal development) and possible teratogenicity at 3000 ppm. However, a comprehensive follow-up study in rats showed only slight fetotoxicity accompanied by maternal toxicity at 3000 ppm, but no teratogenic effects. No significant differences were seen between rats exposed to 1000 ppm or 400 ppm MEK and the control. Likewise an inhalation study with mice showed only fetotoxicity at 3000 ppm and no effects at 1000 ppm or 400 ppm MEK.

The fetotoxicity in mice also was accompanied by maternal toxicity in mice at 3000 ppm. Since effects reported for the fetus (rats & mice) occurred only at dose levels where maternal toxicity was evident and are, therefore, considered secondary outcomes from the maternal toxicity, methyl ethyl ketone is concluded not to be a developmental toxicant.

Other Effects: MEK is not neurotoxic. It has been shown to potentiate the neurotoxic effects of hexane, 2,5-hexanedione and methyl-n-butyl ketone. MEK has also potentiated the liver toxicity of halogenated solvents (e.g., chloroform and carbon tetrachloride) in animal studies.

Repeated Exposure: Male and female rats exposed to 0, 1250, 2500 or 5000 ppm MEK in air for 6 hrs./day, 5 days/week for 90 days failed to demonstrate pathological changes attributable to MEK in the organs and tissues studied. Other studies conducted in rats and on other species at lower exposure levels had similar results. A dose-related increase in absolute and relative liver weights was statistically significant at the 5000 ppm exposure level. These effects are considered adaptive in nature.

12. Ecological Information

Component Ecological Information

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Component	METHYL ETHYL KETONE
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Ecotoxicity: Methyl ethyl ketone has low acute toxicity to fish (LC50 range - 4,600 - 5,640 ppm) and aquatic invertebrates (EC50 range = 1,950 - 8,890 ppm). At above 100 ppm it may inhibit the growth of blue-green algae but such concentrations are unlikely to be reached except for short periods following accidental discharge. A concentration of 900 ppm of MEK in water caused a 50% inhibition of the germination of lettuce (*lactuca sativa*) seeds.

Environmental Fate:

Degradation:

Biodegradation: Extensive data demonstrate that MEK is readily biodegradable. Determinations in freshwater and seawater demonstrated that the BOD was a high percentage of the theoretical oxygen demand. Studies on activated sludge showed that MEK is easily degraded and is not toxic to sludge microorganisms in concentrations up to 800 ug/liter. Photodegradation - Although MEK is less reactive in smog than many other organic chemicals, it does undergo significant photodecomposition probably because of a combination of direct photolysis and OH radical reactions. In the presence of 5 ppm NO, and with 35-40% relative humidity and 10 ppm MEK, a photodecomposition half-life of 9.8 hours was found. The half-life of MEK calculated in urban conditions is likely to be about 5.5 hours.

Bioaccumulation: No direct information is available on the ability of MEK to accumulate in biological material. Its high water solubility, rapid degradation by aquatic bacteria, and low octanol-water partition coefficient of 0.26 suggest that it is unlikely to concentrate in aquatic species. Metabolic studies in man demonstrate that concentrations likely to be present in the environment will not lead to accumulation in human tissues.

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13. Disposal Considerations

Dispose of spilled material in accordance with state and local regulations for hazardous waste. Recommended methods are incineration or biological treatment at a federally or state-permitted disposal facility. Note that this information applies to the material as manufactured; processing, use, or contamination may make this information inappropriate, inaccurate, or incomplete.

Note that this handling and disposal information may also apply to empty containers, liners and rinsate. State or local regulations or restrictions are complex and may differ from federal regulations. This information is intended as an aid to proper handling and disposal; the final responsibility for handling and disposal is with the owner of the waste. See Section 9 - Physical and Chemical Properties.

EPA Hazardous Waste Code(s): U159

14. Transport Information

US Department of Transportation:

UN/NA Number:	UN1193
Shipping name:	ETHYL METHYL KETONE
Hazard class:	3
Packing Group:	PG II
DOT Reportable Quantity (RQ):	5000 lbs/2270 kg (Methyl ethyl ketone)
Emergency Response Guide:	127

ICAO/IATA:

IATA UN Number:	UN1193
Proper Shipping Name:	ETHYL METHYL KETONE
Hazard Classification:	3 (Flammable Liquid)
Packing group:	II
Label:	(Flammable Liquid)

IMDG:

International Marine UN Number:	UN1193
Proper Shipping Name:	ETHYL METHYL KETONE
Hazard Class:	3 (Flammable Liquid)
Packing Group:	II
Flash point (test method):	-9 C (16 F) (Closed Cup)

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Transport Canada

Proper Shipping Name: Methyl Ethyl Ketone

Trade Information

Schedule B Code (export): 2914.12.0000

15. Regulatory Information

U.S. STATE REGULATIONS

Chemicals associated with the product which are subject to the state right-to-know regulations are listed along with the applicable state(s):

METHYL ETHYL KETONE 78-93-3

Pennsylvania	Listed
New York	Listed
New Jersey	Listed
Illinois	Listed
Massachusetts	Listed
Rhode Island	Listed

U.S. FEDERAL REGULATIONS

TSCA Inventory: We certify that all components are either on the TSCA inventory or qualify for an exemption.

Environmental Regulations:

METHYL ETHYL KETONE 78-93-3

EPCRA (SARA Title III) Section 313	Listed
CERCLA Hazardous Substance	Listed
SARA EHS	Listed

SARA 311:

Acute health:	Yes
Chronic health:	Yes
Fire:	Yes
Sudden release of pressure:	No
Reactive:	No

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INTERNATIONAL REGULATIONS

International Chemical Inventory

Listed on the chemical inventories of the following countries or qualifies for an exemption:

AUSTRALIA, CHINA, CANADA, EUROPE, KOREA, PHILIPPINES, JAPAN

CANADIAN REGULATIONS

WHMIS Classification: Class B, Division 2. Class D, Division 2, Subdivision B.

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.

16. Other Information

Prepared by: Product Stewardship Department
Celanese Ltd.

Hazard ratings This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems.

NFPA: Health: 1 Flammability: 3 Reactivity: 0

HMIS: Health: 2* Flammability: 3 Reactivity: 0

Revisions: The following sections have been revised since the last issue of this MSDS.

1. Product and Company Identification (for Asia Pacific MSDSs only)

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For industrial use only. The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. Celanese makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances. Effects can be aggravated by other materials and/or this material may aggravate or add to the effects of other materials. This material may be released from gas, liquid, or solid materials made directly or indirectly from it. User has the sole responsibility to determine the suitability of the materials for any use and the manner of use contemplated. User must meet all applicable safety and health standards. Material safety data sheets are provided on the Internet by Celanese as a service to its customers. Possession of an Internet MSDS does not indicate that the possessor of the MSDS was a purchaser or user of the subject product.

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