

# Material Safety Data for: Methyl Ethyl Ketone

## 1. PRODUCT IDENTIFICATION

**Name** Methyl Ethyl Ketone  
**Synonyms** MEK, 2-Butanone, methyl acetone, ethyl methyl ketone  
**CAS#** 78-93-3  
**Product Uses** solvent in paints & coatings

## 2. INGREDIENTS

	%	TWAEV / TLV mg/m <sup>3</sup>	LD <sub>50</sub> ORAL	(mg/kg) SKIN	LC <sub>50</sub> ppm INHALATION
2-Butanone	100%	200 / 590	1740	6480	10,500

## 3. (a) HAZARDS SUMMARY

**Hazards, Quick Guide:** highly flammable liquid, heavy vapour travels, distant ignition and flashback are possible; irritating to eyes, central nervous depressant

### Canada – WHMIS

Key:

### B 2, D 2B

**B 2** – Flash Point <38°C, **B 3** – Flash Point >38°C & <93°C  
**D 1** – Immediately Toxic, **D 2** – Chronic Toxicity  
**C** – Oxidising Substance, **E** – Corrosive

### U.S.A. – HMIS

Key:

### Health – 2, Fire – 3, Reactivity – 0

0=minimal, 1=slight, 2=moderate, 3=serious, 4=severe

## 3. (b) HAZARDS – TOXICITY

### Effects, Acute Exposure

Skin Contact	aggressively drying – “whitens” skin (by removing oils); may irritate
Skin Absorption	yes; no toxic effects likely by this route
Eye Contact	liquid may be severely irritating; vapour irritating above 200ppm
Inhalation	upper respiratory irritation at 200ppm, but no neurological symptoms after 4 hours at this level; dizziness, drowsiness, intoxication, nausea at higher airborne titres
Ingestion	headache, dizziness, drowsiness, nausea, intoxication

### Effects, Chronic Exposure

General	prolonged exposure may cause dermatitis and skin cracking
Sensitising	not a sensitiser in humans (only one reported case) or animals
Carcinogen/Tumorigen	not considered a tumorigen or a carcinogen in humans or animals
Reproductive Effect	no known effect in humans; fetotoxic in rodents only at doses producing maternal symptoms
Mutagen	no known effect on humans or animals
Synergistic With	not known
LD <sub>50</sub> (oral)	3000 & 3140mg/kg (mouse), 1740, 2350 & 2740mg/kg (rat)
LD <sub>50</sub> (skin)	6480 & 8050mg/kg (rabbit)
LC <sub>50</sub> (inhalation)	11,500ppm (rat), 10,880 & 30,200ppm (mouse), 10,200ppm (guinea pig)

**Please ensure that this MSDS is given to, and explained to people using this product.**

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**4. FIRST AID**

- SKIN: Wash with plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered.
- EYES: Wash eyes with plenty of water, holding eyelids open. Seek medical assistance promptly if there is irritation.
- INHALATION: Remove from contaminated area promptly. **CAUTION: Rescuer must not endanger himself!** If breathing stops, administer artificial respiration and seek medical aid promptly.
- INGESTION: Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim's head below hips to prevent inhalation of vomited material. Seek medical help promptly.

*Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.*

**5. PHYSICAL PROPERTIES**

Odour & Appearance	clear, colourless liquid with sharp, sweetish acetone-like odour
Odour Threshold	5-55ppm – <i>geometric mean is 16ppm</i>
Vapour Pressure	78mmHg / 10.3kPa (20°C / 68°F)
Evaporation Rate ( <i>Butyl Acetate = 1</i> )	2.6
Vapour Density (air = 1)	2.5
Boiling Range	80°C / 175°F
Freezing Point	-87°C / -124°F
Specific Gravity	0.806 (20/20°C)
Water Solubility	275 grams per litre (20°C / 68°F)
Also soluble in	most organic solvents
Viscosity	0.4centipoise (20°C / 68°F)
pH	none – ( <i>does not liberate hydrogen ions when dissolved</i> )
Conversion Factor	1ppm = 2.94g/m <sup>3</sup>
Molecular Weight	72grams per mole

**6. FLAMMABILITY & FIRE FIGHTING**

Flash Point	-9°C / 16°F (closed cup)
Autoignition Temperature	404°C / 759°F – <i>also 505°C / 940°F</i>
Flammable Limits	1.8% – 11.5%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Fire Fighting Precautions	foam, dry chemical, water fog, water spray only to cool & dilute, product floats on water – water jet spreads flames; fire fighters must wear SCBA
Static Charge Accumulation	cannot accumulate a static charge on agitation or pumping

**7. STABILITY / REACTIVITY**

Dangerously Reactive With	strong oxidising agents, halogens and strong alkalis
Also Reactive With	strong acids; forms shock sensitive peroxides with mixtures of H <sub>2</sub> O <sub>2</sub> & HNO <sub>3</sub>
Stability	stable; will not polymerize
Decomposes in Presence of	not known
Decomposition Products	none apart from Hazardous Combustion Products
Sensitive to Mechanical Impact	no

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## 8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL

ACGIH TLV	200ppm / 590mg/m <sup>3</sup>
OSHA PEL	200ppm / 590mg/m <sup>3</sup>
STEL (OSHA)	300ppm / 895mg/m <sup>3</sup>
Ventilation	mechanical ventilation may be required to maintain airborne titre below TWAEV; respirators with organic vapour cartridges should be available for escape purposes should ventilation or containment fail ( <i>respirators should be stored in airtight containers &lt;like "Tupperware"&gt; to maintain "freshness"</i> )
Hands	"Barrier" of "Silver Shield" gloves – <i>other types may also protect; consult supplier for suitability</i>
Eyes	safety glasses with side shields – <i>always protect the eyes</i>
Clothing	wear impermeable (above) apron, boots, & long sleeves if there is any danger of splashing,

## 9. HANDLING & STORAGE

Store in a cool, dry environment, away from sources of ignition, heat and substances named in Part 7 (above). ***Always use non-sparking bronze or aluminium hand tools. All electrical and mechanical equipment (including lighting, switchgear and forklift trucks) used with or around this product must be explosion-proof.***

Although this product cannot retain a static charge on agitation or transfer from one container to another, its flash point is very low and it is prudent to ground or electrically bond both the source container and the receiving container, and transfer pump before transferring contents. Avoid splashing by ensuring that the product nozzle is below the surface in the receiving container.

Empty containers may contain a flammable / explosive vapour. Always ensure that containers, whether empty or full, or part full, are tightly sealed unless in use.

Avoid breathing product vapour. Use with adequate ventilation. If dealing with a spill, and ventilation is impossible or impractical, wear a suitable respirator with organic vapour cartridge.

Never cut, drill, weld or grind on or near this container. Avoid contact with skin and wash work clothes frequently. An eye bath and safety shower must be available near the workplace.

## 10. SPILL PROCEDURES

***Serious Fire Potential: blanket spill with foam as a precaution against accidental ignition. Take extreme care to avoid sparks – do not operate (turn on OR off) electrical appliances near spill, unless explosion proof.***

Leak Precaution dyke to control spillage and prevent environmental contamination

Handling Spill ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep & pick up using plastic or aluminium shovel, & store in closed containers for recycling or disposal

## 11. DISPOSAL

Waste Disposal **do not flush to sewer**, recycle solvent if possible, may be incinerated in approved facility

Containers **Drums** should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use.  
**Pails** must be vented and thoroughly dried prior to crushing and recycling.  
**IBCs** (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs). Steel containers must be inspected, pressure tested & recertified every 5 years.  
*Never cut, drill, weld or grind on or near this container, even if empty*



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**12. ENVIRONMENTAL INFORMATION**

Bioaccumulation	this product is not a bioaccumulator; biological half-life is 4-5 hours
Biodegradation	this product degrades readily and rapidly in the presence of oxygen; 89% degradation in 20days
Abiotic Degradation	this product reacts with atmospheric hydroxyl radicals; its estimated half-life in air is 14 days, and just 4 days for direct photolysis
Mobility in soil, water	this product is water soluble and will move readily in soil and water
<b>Aquatic Toxicity</b>	
LC <sub>50</sub> (Fish, 96hr)	3220mg/litre (pimephelas promelas), 5600mg/litre (gambusia affinis), 4467mg/litre (lepomis macrochirus)
EC <sub>50</sub> (Crustacea, 48hr)	5090mg/litre (daphnia magna)
EC <sub>50</sub> (Bacteria)	5100mg/litre (photobacterium phosphoreum, 5min)

**13. TRANSPORT REGULATIONS**

<b>Canada TDG</b>	<b>PIN</b>	<b>UN-1193</b>
<b>AND</b>	<b>Shipping Name</b>	<b>methyl ethyl ketone</b>
<b>U.S.A. 49 CFR</b>	<b>Class</b>	<b>3</b>
	<b>Packing Group</b>	<b>II</b>
<b>Marine Pollutant</b>		<b>not a marine pollutant</b>

**14. EMERGENCY INFORMATION**

<b>Canada</b>	<b>Call CANUTEC (collect)</b>	<b>(613) 996-6666</b>
<b>U.S.A.</b>	<b>Call CHEMTREC</b>	<b>(800) 424-9300</b>

**15. REGULATIONS**

<b>Canada DSL</b>	<b>on inventory</b>
<b>U.S.A. TSCA</b>	<b>on inventory</b>
<b>Europe EINECS</b>	<b>on inventory (EC# 201-159-0)</b>

**Immediately Dangerous to Life or Health:** 3000 ppm  
**Acceptable Daily Intakes:** An Acceptable Daily Intake (ADI), defined as the amount of a chemical to which humans can be exposed on a daily basis over an extended period of time (usually a lifetime) without suffering a deleterious effect, for methyl ethyl ketone is 3.2 mg/day for oral exposure.  
**Allowable Tolerances:** Residues of methyl ethyl ketone are exempted from the requirement of a tolerance when used as a surfactant in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.  
**OSHA Standards:** Permissible Exposure Limit: Table Z-1 8-hr Time Weighted Avg: 200 ppm (590 mg/cu m). Vacated 1989 OSHA PEL TWA 200 ppm (590 mg/cu m); STEL 300 ppm (885 mg/cu m) is still enforced in some states.  
**NIOSH Recommendations:** Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 200 ppm (590 mg/cu m). Recommended Exposure Limit: 15 Min Short-Term Exposure Limit: 300 ppm (885 mg/cu m).  
**Threshold Limit Values:** 8 hr Time Weighted Avg (TWA): 200 ppm; 15 min Short Term Exposure Limit (STEL): 300 ppm. Biological Exposure Index: Determinant: methyl ethyl ketone in urine; Sampling Time: end of shift; BEI: 2 mg/L.  
**Atmospheric Standards:** This action promulgates standards of performance for equipment leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemical Manufacturing Industry (SOCMI). The intended effect of these standards is to require all newly constructed, modified, and reconstructed SOCMI process units to use the best demonstrated system of continuous emission reduction for equipment leaks of VOC, considering costs, non air quality health and environmental impact and energy requirements. Methyl ethyl ketone is produced, as an intermediate or final product, by process units covered under this subpart. Listed as a hazardous air pollutant generally known or suspected to cause serious health problems. The Clean Air Act, as amended in 1990, directs EPA to set standards requiring major sources to sharply reduce routine emissions of toxic pollutants. EPA is required to establish and phase in specific performance based standards for all air emission sources that emit one or more of the listed pollutants. Methyl ethyl ketone is included on this list.  
**Federal Drinking Water Guidelines:** EPA 4,000 ug/L  
**State Drinking Water Guidelines:** Arizona 170 ug/L, Florida 4,200 ug/L, Massachusetts 350 ug/L, Maine 1440 ug/L, Minnesota 4000 ug/L, New Hampshire 170 ug/L, New Jersey 270 ug/L, Wisconsin 460 ug/L  
**CERCLA Reportable Quantities:** Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 5000 lb or 2270 kg. The toll free number of the NRC is (800) 424-8802. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b).

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## 15. REGULATIONS (USA), cont'd

**TSCA Requirements:** Pursuant to section 8(d) of TSCA, EPA promulgated a model Health and Safety Data Reporting Rule. The section 8(d) model rule requires manufacturers, importers, and processors of listed chemical substances and mixtures to submit to EPA copies and lists of unpublished health and safety studies. Methyl ethyl ketone is included on this list. Effective date 10/4/1982, Sunset date 10/4/1992.

**RCRA Requirements:** As stipulated in 40 CFR 261.33, when 2-butanone, as a commercial chemical product or manufacturing chemical intermediate or an off-specification commercial chemical product or a manufacturing chemical intermediate, becomes a waste, it must be managed according to Federal and/or State hazardous waste regulations. Also defined as a hazardous waste is any residue, contaminated soil, water, or other debris resulting from the cleanup of a spill, into water or on dry land, of this waste. Generators of small quantities of this waste may qualify for partial exclusion from hazardous waste regulations (40 CFR 261.5). When methyl ethyl ketone is a spent solvent, it is classified as a hazardous waste from a nonspecific source, as stated in 40 CFR 261.31, and must be managed according to State and/or Federal hazardous waste regulations. A solid waste containing methyl ethyl ketone may or may not become characterized as a hazardous waste when subjected to the Toxicity Characteristic Leaching Procedure listed in 40 CFR 261.24, and if so characterized, must be managed as a hazardous waste.

**FIFRA Requirements:** Residues of methyl ethyl ketone are exempted from the requirement of a tolerance when used as a surfactant in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.

**FDA Requirements:** Methyl ethyl ketone is an indirect food additive for use only as a component of adhesives. Methyl ethyl ketone is a food additive permitted for direct addition to food for human consumption as a synthetic flavoring substance and adjuvant in accordance with the following conditions: a) they are used in the minimum quantity required to produce their intended effect, and otherwise in accordance with all the principles of good manufacturing practice, and 2) they consist of one or more of the following, used alone or in combination with flavoring substances and adjuvants generally recognized as safe in food, prior-sanctioned for such use, or regulated by an appropriate section in this part.

## 16. PREPARATION INFORMATION

Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577

File Name: **MEK**

With data from RTECS, Haz. Substance Data Base, Cheminfo (CCOHS), IUCLID Datasheets (European Chem. Substance Info. System), & others, as available

Preparation Date: **December 2003** Revision Date: **September 2006, September 2009**

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