



Safety Data Sheet

1. PRODUCT IDENTIFICATION

Name	Methyl Ethyl Ketone
Synonyms	MEK, 2-Butanone, methyl acetone, ethyl methyl ketone
CAS#	78-93-3
Europe EC#	201-159-0
Product Uses	solvent in paints & coatings

2. 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, F – Reactive Substance

U.S.A. – HMIS

Key:

Health – 2, Fire – 3, Reactivity – 0

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

3. COMPOSITION

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

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. FIRE FIGHTING & FLAMMABILITY

Flash Point	-9°C / 16°F (closed cup)
Autoignition Temperature	404°C / 759°F – also 505°C / 940°F
Flammable Limits	1.4% – 11.5%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Fire Fighting Precautions	foam, dry chemical, water fog or spray 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

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

6. ACCIDENTAL RELEASE MEASURES

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

7. 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 low & it is prudent to ground or electrically bond the source container 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.

8. EXPOSURE CONTROL & PERSONAL PROTECTION

Ontario TWAEV	200ppm / 590mg/m ³
Ontario STEV	300ppm / 885mg/m ³
ACGIH TLV	200ppm / 590mg/m ³
OSHA PEL	200ppm / 590mg/m ³
Ventilation	mechanical ventilation may be required to control airborne titre to regulated limits; respirators with organic vapour cartridges should be available for escape purposes should ventilation or containment fail (<i>store respirators in airtight containers [eg: "Tupperware" to maintain "freshness"]</i>)
Hands	"Barrier" or "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. 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	0.43centipoise (20°C / 68°F)
pH	none – (<i>does not liberate hydrogen ions when dissolved</i>)
Conversion Factor	1ppm = 2.94g/m ³
Molecular Weight	72grams per mole

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10. REACTIVITY

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

11. TOXICITY

Effects, Acute Exposure

Skin Contact	aggressively drying – “whitens” skin (by removing oils); may irritate
Skin Absorption	yes; but 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 – <i>not a route of industrial exposure</i>

Effects, Chronic Exposure

General	prolonged exposure may cause dermatitis
Sensitising	not a sensitiser in humans (<i>only one reported case</i>) 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 ₅₀ (oral)	3000 & 3140mg/kg (mouse), 1740, 2350, 2740 & 2600-5400mg/kg (rat)
LD ₅₀ (skin)	6480 & 8050mg/kg (rabbit)
LC ₅₀ (inhalation)	11,500ppm (rat), 10,880 & 30,200ppm (mouse), 10,200ppm (guinea pig)

12. ECOLOGICAL INFORMATION

Bioaccumulation	not a bioaccumulator; biological ½-life is 4-5 hours
Biodegradation	biodegrades readily & rapidly in the presence of oxygen; 89% in 20 days, anaerobic 89% in 21 days
Abiotic Degradation	reacts with atmospheric hydroxyl radicals; estimated ½-life in air 14 days; 4 days (<i>direct photolysis</i>)
Mobility in soil, water	water soluble; moves readily in soil and water
Aquatic Toxicity	
LC ₅₀ (Fish, 96hr)	3220mg/litre (Pimephelas promelas), 5600mg/litre (Gambusia affinis), 4467mg/litre (Lepomis macrochirus),
EC ₅₀ (Crustacea, 48hr)	5090mg/litre (Daphnia magna)
EC ₃ (Algæ)	1200mg/litre (Microcystis aeruginosa), 4300mg/litre (Scenedesmus quadricauda)
EC ₅₀ (Bacteria)	5100mg/litre (Photobacterium phosphoreum),
EC ₃ (Bacteria)	1150mg/litre (Pseudomonas putida)

13. 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. <i>Never cut, drill, weld or grind on or near this container, even if empty</i>

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14. TRANSPORT CLASSIFICATION

Canada TDG	PIN	UN-1193
AND	Shipping Name	methyl ethyl ketone
U.S.A. 49 CFR	Class	3
	Packing Group	II
Marine Pollutant	not a marine pollutant	
ERAP Required		NO

EMERGENCY INFORMATION

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

15. REGULATIONS

Canada DSL	on inventory
U.S.A. TSCA	on inventory
Europe EINECS	on inventory

Europe Risk Phrases **R: 11, 36, 66, 67** – *Highly flammable. Irritating to the eyes. Repeated exposure may cause skin dryness or cracking. Vapours may cause drowsiness and dizziness.*

Europe Safety Phrases **S: 9, 16** - *Keep container in a well-ventilated place. Keep away from sources of ignition - No smoking.*

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 (BEI): 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 4,000 ug/L, Maine 3,600 ug/L, Minnesota 4,000 ug/L, New Hampshire 4,000 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, 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 (F005), 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. OTHER INFORMATION

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Data from RTECS, HSDB (Haz. Substance Data Base), Cheminfo (CCOHS), IUCLID Datasheets (ESIS – European Chem. Substance Info. System), & others.

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