



Safety Data Sheet

1. PRODUCT IDENTIFICATION

Name	Methyl Isobutyl Ketone
Synonyms	2-methyl-4-pentanone, 4-methyl-2-pentanone, isopropylacetone, MIBK
CAS#	108-10-1
Europe EC#	203-550-1
Product Uses	solvent in coatings, for extraction, adhesives, reagent

2. HAZARDS

Quick Guide: flammable liquid, heavy vapour travels, distant ignition and flashback are possible; mildly irritating

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



B2 – Flammable Liquid

U.S.A. – HMIS
Key:

Health – 2, Fire – 3, Reactivity – 0
0=minimal, 1=slight, 2=moderate, 3=serious, 4=severe



D2A – Very Toxic

3. COMPOSITION

	%	TWAEV / TLV ppm / mg/m ³	LD ₅₀ (mg/kg) ORAL	LD ₅₀ (mg/kg) SKIN	LC ₅₀ ppm INHALATION
2-methyl-4-pentanone	100%	50 / 205*	1600	>3000	2000

* NOTE: the ACGIH TLV is considerably lower than the Ontario value given.

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	13°C / 56°F (closed cup) ó also 18°C / 54°F (closed cup)
Autoignition Temperature	448°C / 840°F – also 460°C / 860°F
Flammable Limits	1.2% ó 8%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Firefighting Precautions	foam, dry chemical, water fog or spray to cool & dilute, product floats on water ó water jet spreads flames; firefighters 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 oxidising agents. 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.

This product may react with oxygen in the air to form explosive or flammable peroxides, particularly at elevated temperature. Ensure that containers are full and tightly sealed. If prolonged storage of a part container is anticipated, flush headspace with dry nitrogen gas prior to sealing. 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 an 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	50ppm / 205mg/m ³	Ontario STEV	75ppm / 307mg/m ³
ACGIH TLV	20ppm / 81mg/m ³	<i>Note that this ACGIH TLV is considerably lower than the Ontario TWAEV.</i>	
OSHA PEL	100ppm / 410mg/m ³		
Ventilation	mechanical ventilation may be required to control airborne titre		
Hands	øBarrierø, øSilver Shieldø, or øTychemø gloves recommended ø other types may also protect; consult supplier to confirm suitability		
Eyes	safety glasses with side shields ø always protect the eyes		
Clothing	no special protective clothing required		

9. PHYSICAL PROPERTIES

Odour & Appearance	clear, colourless liquid with sharp, sweetish odour
Odour Threshold	0.3 ø 16ppm
Vapour Pressure	6mmHg / 0.8kPa (20°C / 68°F)
Evaporation Rate (<i>Butyl Acetate = 1</i>)	1.6
Vapour Density (air = 1)	3.5
Boiling Range	116°C / 241°F ø also 118°F / 244°F
Freezing Point	-80°C / -112°F ø also -85°C / -121°F
Specific Gravity	0.802 (20/20°C)
Water Solubility	18 grams per litre (20°C / 68°F)
Also soluble in	most organic solvents
Viscosity	0.6centipoise (25°C / 77°F)
pH	none ø (<i>does not liberate hydrogen ions when dissolved</i>)
Conversion Factor	1ppm = 4.09mg/m ³
Molecular Weight	100grams per mole

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10. REACTIVITY

Dangerously Reactive With	strong oxidising agents, strong alkalies, strong reducing agents
Also Reactive With	attacks many plastics
Stability	stable; will not polymerize
Decomposes in Presence of	heat
Decomposition Products	methyl isobutyl peroxide
Sensitive to Mechanical Impact	no

11. TOXICITY

Effects, Acute Exposure

Skin Contact	mild irritant
Skin Absorption	slight; no toxic effects likely by this route
Eye Contact	liquid is a mild irritant; vapour irritating above 200ppm; will not damage eyes
Inhalation	headache, nose & throat irritation at above 100ppm, dizziness, drowsiness, intoxication at >200ppm
Ingestion	headache, dizziness, nausea, vomiting

Effects, Chronic Exposure

General	prolonged exposure may cause dermatitis; protracted exposure to 80-500ppm increases likelihood of skin lesions, respiratory irritation & other malaise; <i>symptoms markedly reduced at 50-100ppm</i>
Sensitising	not a sensitiser in humans or animals
Carcinogen/Tumorigen	not considered a tumorigen or a carcinogen in humans; ACGIH proposes MIBK may be an animal carcinogen (A3)
Reproductive Effect 65 ¹	listed as a reproductive toxin on inhalation (<i>developmental abnormalities</i>): California Proposition
Mutagen	no known effect on humans or animals
Synergistic With	ethanol, halogenated hydrocarbons
LD ₅₀ (oral)	2080-4600mg/kg (rat), 1900-2850mg/kg (mouse), 1600mg/kg (guinea pig)
LD ₅₀ (skin)	above 3000mg/kg (rabbit), above 16,000mg/kg (rabbit)
LC ₅₀ (inhalation)	2000-4000ppm (rat), 5700ppm (mouse)

12. ECOLOGICAL INFORMATION

Bioaccumulation	rapidly metabolised or excreted; cannot bioaccumulate
Biodegradation	biodegrades rapidly in the presence of oxygen; in 5 days 76%; also 53% in 20 days in sea water
Abiotic Degradation	reacts with atmospheric hydroxyl radicals; estimated ½-life in air is 14 hours
Mobility in soil, water	sufficiently water soluble to move readily in soil and water
Aquatic Toxicity	
LC ₅₀ (Fish, 96hr)	505, 509 & 780mg/litre (Pimephelas promelas), 600mg/litre (Salmo gairdneri), 672 & 744mg/litre (Leuciscus idus, 48hr)
EC ₅₀ (Crustacea, 24hr)	1230mg/litre (Artemia salina), 240, 862, 930, 1550, 3682 & 4280 mg/litre (Daphnia magna)
EC ₅₀ (Algae)	980mg/litre (Scenedesmus subspicatus), 400mg/litre (Selenastrum capricorn)
EC ₅₀ (Bacteria)	80mg/litre (Photobacterium phosphoreum)
EC ₁₀ (Bacteria)	413mg/litre (Pseudomonas putida) ó <i>this is an EC₁₀, not an EC₅₀</i>

13. DISPOSAL

Waste Disposal	do not flush to sewer , recycle solvent if possible, if local regulations permit, may be put in sanitary landfill, may be incinerated in approved facility: above 450°C in fluidised bed incinerator; above 820°C in rotary kiln
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 - 1245
AND	Shipping Name	methyl isobutyl ketone
U.S.A. 49 CFR	Class & Packing Group	3 (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

Immediately Dangerous to Life or Health: 500 ppm

Allowable Tolerances: Residues of methyl isobutyl ketone are exempted from the requirement of a tolerance when used as a solvent in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest. Residues of methyl isobutyl ketone are exempted from the requirement of a tolerance when used as a solvent, cosolvent in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only. Residues of methyl isobutyl ketone are exempted from the requirement of a tolerance when used as a solvent, cosolvent in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to animals.

OSHA Standards: Permissible Exposure Limit: Table Z-1 8-hr Time Weighted Avg: 100 ppm (410 mg/cu m).

NIOSH Recommendations: Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 50ppm (205mg/m³). Recommended Exposure Limit: 15 Min Short-Term Exposure Limit: 75ppm (300mg/m³).

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 50 ppm; 15 min Short Term Exposure Limit (STEL): 75 ppm. Biological Exposure Index (BEI): Determinant: methyl isobutyl ketone in urine; Sampling Time: end of shift; BEI: 2 mg/L. 2008 Notice of Intended Changes: These substances, with their corresponding values and notations, comprise those for which (1) a limit is proposed for the first time, (2) a change in the Adopted value is proposed, (3) retention as an NIC is proposed, or (4) withdrawal of the Documentation and adopted TLV is proposed. In each case, the proposals should be considered trial values during the period they are on the NIC. These proposals were ratified by the ACGIH Board of Directors and will remain on the NIC for approximately one year following this ratification. If the Committee neither finds nor receives substantive data that changes its scientific opinion regarding an NIC TLV, the Committee may then approve its recommendation to the ACGIH Board of Directors for adoption. If the Committee finds or receives substantive data that change its scientific opinion regarding an NIC TLV, the Committee may change its recommendation to the ACGIH Board of Directors for the matter to be either retained on or withdrawn from the NIC. Substance: Methyl isobutyl ketone; Time Weighted Avg (TWA): 30 ppm; Short Term Exposure Limit (STEL): 75 ppm; A3: Confirmed animal carcinogen with unknown relevance to humans; Molecular Weight: 100.16; TLV Basis-Critical Effect(s): CNS impairment; irritation; dizziness; nausea; headache.

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 SOCM 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 isobutyl ketone is produced, as an intermediate or final product, by process units covered under this subpart. Listed as a hazardous air pollutant (HAP) 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 isobutyl ketone is included on this list.

State Drinking Water Guidelines: California 120ug/l, Florida 350ug/l, Massachusetts 350ug/l, Minnesota 300ug/l, New Hampshire 2,000ug/L, Wisconsin 500ug/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).

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 isobutyl ketone is included on this list. Effective date 10/4/82; Sunset date 10/4/92. A testing consent order is in effect for methyl isobutyl ketone for health effects testing. FR citation: 1/23/95.

RCRA Requirements: As stipulated in 40 CFR 261.33, when methyl isobutyl ketone, 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 isobutyl 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.

FIFRA Requirements: Residues of methyl isobutyl ketone are exempted from the requirement of a tolerance when used as a solvent in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest. Residues of methyl isobutyl ketone are exempted from the requirement of a tolerance when used as a solvent, cosolvent in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only. Residues of methyl isobutyl ketone are exempted from the requirement of a tolerance when used as a solvent, cosolvent in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to animals.

FDA Requirements: Methyl isobutyl 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. Methyl isobutyl ketone is an indirect food additive for use only as a component of adhesives.

16. OTHER INFORMATION

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

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

Preparation Date: **December 2003** Revision Date: **October 2006, October 2009, October 2012, Apr 2014 (minor)**

(1) California Office of Environmental Health Hazard Assessment (OEHHA), Mar. 2014:

http://oehha.ca.gov/prop65/CRNR_notices/admin_listing/intent_to_list/090613NOILMIK.html

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