Established in 1981
megaloid laboratories limited
2221 Ninth Line | Oakville, ON L6H 7G7
Phone: 905-337-7411 | Fax: 905-337-1686
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Material Safety Data for: Methyl Isobutyl Ketone

1. PRODUCT INDENTIFICATION

Name	**2-methyl-4-pentanone**
Synonyms	**4-methyl-2-pentanone, isopropyl acetone, MIBK**
CAS#	**108-10-1**
Product Uses	**solvent in coatings, for extraction, adhesives, reagent**

2. INGREDIENTS

	%	TWAEV / TLV mg/m^3	LD_{50} ORAL	(mg/kg) SKIN	LC_{50} ppm INHALATION
2-methyl-4-pentanone	100%	50 / 205	1600	>3000	2000

3. (a) HAZARDS SUMMARY

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

Canada – WHMIS	**B 2**
Key:	***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	**Health – 1, Fire – 3, Reactivity – 0**
Key:	***0****=minimal,* ***1****=slight,* ***2****=moderate,* ***3****=serious,* ***4****=severe*

3. (b) HAZARDS – 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 above100ppm, dizziness, drowsiness, intoxication at above 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 and other malaise; *these symptoms were markedly reduced when airborne titre was reduced to 50-100ppm*
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	no known effect in humans or animals
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)

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4. FIRST AID

SKIN: Wash with soap and plenty of water. Remove contaminated clothing and do not reuse until thoroughly cleaned or 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 odour
Odour Threshold	0.3 – 16ppm
Vapour Pressure	6mmHg / 0.8kPa (20°C / 68°F)
Evaporation Rate (*Butyl Acetate = 1*)	1.6
Vapour Density (air = 1)	3.5
Boiling Range	116°C / 241°F
Freezing Point	-80°C / -112°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 – (*does not liberate hydrogen ions when dissolved*)
Conversion Factor	1ppm = 4.09mg/m^3
Molecular Weight	100grams per mole

6. FLAMMABILITY & FIRE FIGHTING

Flash Point	13°C / 56°F (closed cup)
Autoignition Temperature	448°C / 840°F
Flammable Limits	1.2% – 8%
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

7. STABILITY / 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

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8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL

ACGIH TLV	50ppm / 205mg/m^3
OSHA PEL	100ppm / 410mg/m^3
STEL (NIOSH)	75ppm / 307mg/m^3
Ventilation	mechanical ventilation may be required to control airborne titre
Hands	"Barrier", "Silver Shield", or "Tychem" gloves recommended – *other types may also protect; consult supplier to confirm suitability*
Eyes	safety glasses with side shields – *always protect the eyes*
Clothing	no special protective clothing required

9. 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.

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, 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. ***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 rapidly metabolised or excreted and cannot bioaccumulate
Biodegradation	this product degrades rapidly in the presence of oxygen; biodegradation in 5 days 30% - 55%
Abiotic Degradation	this product reacts with atmospheric hydroxyl radicals; its estimated half-life in air is 27 hours
Mobility in soil, water	this product is sufficiently water soluble to move readily in soil and water
Aquatic Toxicity	
LC_{50} (Fish, 96hr)	505-780mg/litre (pimephelas promelas), 672 & 744mg/litre (leuciscus idus, 48hr) *& other data*
EC_{50} (Crustacea, 24hr)	1230mg/litre (artemia salina), 240, 862 & 3682mg/litre (daphnia magna), *& other data*
EC_{50} (Algae)	980mg/litre (scenedesmus subspicatus), 400mg/litre (selenastrum capricorn)

13. TRANSPORT REGULATIONS

Canada TDG	**PIN**	**UN-1245**
AND	**Shipping Name**	**methyl isobutyl ketone**
U.S.A. 49 CFR	**Class**	**3**
	Packing Group	**II**
Marine Pollutant		**not a marine pollutant**

14. 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 (EC#)**

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: 50 ppm (205 mg/cu m). Recommended Exposure Limit: 15 Min Short-Term Exposure Limit: 75 ppm (300 mg/cu m).

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 vaules 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 any 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.

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15. REGULATIONS, cont'd

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 isobutyl 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 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 350ug/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: U161; 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. PREPARATION INFORMATION

Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577 File Name: **MIBK**
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*: ***October 2006, October 2009***

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