



Safety Data Sheet

1. PRODUCT IDENTIFICATION

Name	Methyl Methacrylate
Synonyms	methyl 2-methyl-2-propenoate; 2-methyl propenoic acid, methyl ester; methyl- <i>alpha</i> -methyl acrylate; MMA; methacrylic acid, methyl ester
CAS#	80-62-6
Europe EC#	201-297-1
Product Uses	monomer for manufacture of acrylic plastics & coating resins

2. HAZARDS

Quick Guide: flammable liquid, heavy vapour may travel, distant ignition and flashback are possible, irritating to skin and eyes; skin sensitiser; central nervous depressant

Canada – WHMIS

Key:

B 2, D 2B, F* (* in the absence of inhibitor)

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



D2B – Toxic



F – Dangerously Reactive
(if not stabilised)

U.S.A. – HMIS

Key:

Health – 2/3, Fire – 3, Reactivity – 2 (4*) (*reactive if not stabilised)

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
methyl 2-methyl-2-propenoate	100%	50 / 205	3625	>5000	3205

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.

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

5. FIRE FIGHTING & FLAMMABILITY

Flash Point	2°C / 36°F (closed cup); 10°C / 50°F (open cup)
Autoignition Temperature	435°C / 815°F
Flammable Limits	1.7% – 8.2%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Firefighting Precautions	alcohol or polymer foam, dry chemical, water fog or spray, product floats on water; firefighters must wear SCBA
Static Charge Accumulation	probably not a static accumulator – <i>esters tend to have high electric conductivity</i>

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 – no longer than 6 months – below 25°C, & away from substances named in Part 10. ***Take extreme care to avoid sparks. Use only non-sparking bronze or aluminium hand tools. All electrical and mechanical equipment (including lighting, switchgear & 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, & transfer pump before transferring contents. Avoid splashing by ensuring the product nozzle is below the surface in the receiving container.

Never use compressed air to transfer this product.

If stored over one month, check titre of inhibitor (*hydroquinone 100-200ppm is often used*). Replenish as necessary.

The inhibitor requires oxygen to work properly! Never store the product under nitrogen!

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. If the spill is extensive, wear an air-supplied respirator.

Never cut, drill, weld or grind on or near this container. ***Empty containers may contain a flammable vapour!*** 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	100ppm / 410mg/m ³
ACGIH TLV	50ppm / 205mg/m ³		
OSHA PEL	100ppm / 410mg/m ³		
Ventilation	mechanical ventilation may be needed to control airborne titre to regulated limits		
Hands	“Tychem” or “Responder” gloves – <i>others may also protect; consult supplier to confirm 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,		

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9. PHYSICAL PROPERTIES

Odour & Appearance	clear, colourless liquid with fruity but pungent, acrid odour
Odour Threshold	0.05ppm
Vapour Pressure	29mmHg / 3.9kPa (20°C / 68°F)
Evaporation Rate (<i>Butyl Acetate=1</i>)	3.1
Vapour Density (air = 1)	3.5
Boiling Range	100-101°C / 212-214°F
Freezing Point	-48°C / -54°F
Specific Gravity	0.944 (20/20°C)
Water Solubility	15 grams per litre (20°C / 68°F) Also soluble in most organic solvents, limited solubility in glycols and methanol
Viscosity	0.6centipoise (20°C / 68°F) – <i>thin mobile liquid</i>
pH	none – (<i>does not liberate hydrogen ions when dissolved</i>)
Conversion Factor	1ppm = 4.09mg/m ³
Molecular Weight	100grams per mole

10. REACTIVITY

Dangerously Reactive With	strong oxidising agents, alkalies, acids; azo-compounds, catalytic metals (copper or iron), reducing agents, amines, halogens & propionaldehyde can cause dangerous, rapid polymerisation
Also Reactive With	none known
Stability	stable in presence of inhibitor; <i>NOTE</i> : methyl methacrylate vapour is inhibitor-free & prone to polymerise in storage tank vents; vapour may also polymerize dangerously
Decomposes in Presence of	sunlight, ultraviolet light, ionising radiation may decompose <i>or</i> cause polymerisation
Decomposition Products	auto-oxidation in air may form explosive polyperoxides
Sensitive to Mechanical Impact	no

11. TOXICITY

Effects, Acute Exposure

Skin Contact	moderate irritant
Skin Absorption	slight; no toxic effects likely by this route
Eye Contact	moderate irritant
Inhalation	irritating above 170ppm; may cause headache, dizziness, drowsiness, intoxication, shortness of breath, chest pain, pulmonary oedema, eventual collapse
Ingestion	may cause headache, dizziness, drowsiness, intoxication – <i>not a route of industrial exposure</i>

Effects, Chronic Exposure

General	pulmonary & neurotoxic effects are proven (<i>other observations remain unconfirmed</i>): coughing & mild chronic obstructive pulmonary disease; persistent headaches, dizziness
Sensitising	skin sensitiser in humans; <i>not</i> recognised as a respiratory sensitiser
Carcinogen/Tumorigen	not considered a tumorigen or a carcinogen in humans or animals
Reproductive Effect	no known effect in humans or animals
Mutagen	no known effect on humans or animals
Synergistic With	not known
LD ₅₀ (oral)	7900-9400mg/kg (rat, <i>several tests</i>), 3625 & 5300mg/kg (mouse), 5955mg/kg (guinea pig), 6000 & 8700mg/kg (rabbit), 4725mg/kg (dog)
LD ₅₀ (skin)	>5000 & >7550mg/kg (rabbit)
LC ₅₀ (inhalation)	7090 & 19,000ppm (rat), 3205 & 4500ppm (mouse)

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12. ECOLOGICAL INFORMATION

Bioaccumulation	this product is rapidly metabolised and is not a bioaccumulator
Biodegradation	this product degrades readily and rapidly in the presence of oxygen; >90% biodegradation in 2 weeks other tests show slower rates of biodegradation
Abiotic Degradation	this product reacts with atmospheric hydroxyl radicals; its estimated ½-life in air is 15hr
Mobility in soil, water	this product is sufficiently water soluble to move readily in soil and water
Aquatic Toxicity	
LC ₅₀ (Fish, 96hr)	191 & 232-357mg/litre (Lepomis macrochirus), >79mg/litre (Oncorhynchus mykiss), 277mg/litre (Carcassius auratus), 368mg/litre (Lebistes reticulatus), 130-460mg/litre (Pimephelas promelas), & others
EC ₅₀ (Crustacea, 48hr)	69 & 720mg/litre (Daphnia magna)
EC ₅₀ (Algae)	170mg/litre (Selenastrum capricornutum)
EC ₂₀ (Bacteria)	>1000mg/litre ("other bacteria") NOTE: LC ₂₀ – only 20% inhibition of growth rate

13. DISPOSAL

Waste Disposal	do not flush to sewer , incinerate in approved facility with flue gas monitoring & scrubbing
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>

14. TRANSPORT CLASSIFICATION

Canada TDG	PIN	UN - 1247
AND	Shipping Name	methyl methacrylate monomer, stabilised
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
Europe Classification	Harmful Flammable
Europe Risk Phrases	R: 11, 37/38, 43 – Highly flammable. Irritating to respiratory system and skin. May cause sensitization by skin contact
Europe Safety Phrases	S: 24, 37, 46 – Avoid contact with skin. Wear suitable gloves. If swallowed, seek medical advice immediately.

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15. REGULATIONS, cont'd

Immediately Dangerous to Life or Health: 1000 ppm

Acceptable Daily Intakes: An adi /acceptable daily intake/ of 0.1 mg/kg/day was calculated on basis of available chronic toxicity data.

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: 100 ppm (410 mg/cu m).

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 50 ppm; 15 min Short Term Exposure Limit (STEL): 100 ppm. Sensitization. A4; Not classifiable as a human carcinogen.

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 methacrylate is produced, as an intermediate or a 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 methacrylate is included on this list.

State Drinking Water Guidelines: Florida 25 ug/L

Clean Water Act Requirements: Methyl methacrylate is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance.

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 1000 lb or 454 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 methacrylate is included on this list. Effective date 4/13/89; Sunset date: 6/30/98.

RCRA Requirements: As stipulated in 40 CFR 261.33, when methyl methacrylate, 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).

FDA Requirements: Homopolymers and copolymers of methyl methacrylate are an indirect food additive for use only as a component of adhesives.

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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