

Material Safety Data for: Ethyl Acrylate

1. PRODUCT IDENTIFICATION

Name 2-propenoic acid, ethyl ester
Synonyms ethyl 2-propenoate; ethyl acrylate; acrylic acid, ethyl ester
CAS# 140-88-5
Product Uses monomer for acrylic resins

2. <u>INGREDIENTS</u>	%	TWAEV / TLV mg/m ³	LD ₅₀ ORAL	(mg/kg) SKIN	LC ₅₀ ppm INHALATION
Ethyl Acrylate	100%	5 / 20	370	470	1200

3. (a) HAZARDS SUMMARY

Hazards, Quick Guide: flammable liquid, heavy vapour may travel, distant ignition and flashback are possible, corrosive to skin, eyes, & lungs, skin sensitiser; suspect carcinogen; dangerously reactive vapour, *liquid reactive if inhibitor titre low*

Canada – WHMIS
Key:

B 2, D 1A, D 2A, E, F* (*if inhibitor titre – see Part 9 – is low)
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

U.S.A. – HMIS
Key:

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

3. (b) HAZARDS – TOXICITY

Effects, Acute Exposure

Skin Contact short exposure mildly irritating; corrosive if contact is prolonged (eg: soaked clothing)
Skin Absorption slight; no toxic effects likely by this route
Eye Contact liquid corrosive to eyes; may cause blindness; vapour above 25ppm severely irritating
Inhalation severely irritating (usually only upper respiratory tract), lungs may (rarely) also be involved & life-threatening oedema may develop; shortness of breath may occur hours later; 50-75ppm reported to cause drowsiness, headache and nausea (*NOTE: product vapour pressure is high*)
Ingestion irritating to mouth, throat & stomach; abdominal pain and diarrhoea may occur

Effects, Chronic Exposure

General prolonged exposure may cause blistering & severe irritation; redness of eyes at 25ppm
Sensitising skin sensitiser in humans & animals
Carcinogen/Tumorigen likely carcinogen in animals; possible carcinogen in humans (IARC)
Reproductive Effect no known effect in humans or animals
Mutagen no known effect on humans or animals
Synergistic With not known
LD₅₀ (oral) 550, 800, 1020, 2000mg/kg (rat), 1800mg/kg (mouse), 370mg/kg (rabbit), 735mg/kg (cat)
LD₅₀ (skin) 470 & 1800mg/kg (rat); 3000mg/kg (mouse), 1800 & 2000mg/kg (rabbit),
LC₅₀ (inhalation) 3960ppm (mouse), 1400, 1800 & 2180ppm (rat), 1200ppm (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, unpleasant, fruity odour – lacrymator (causes tears)
Odour Threshold	0.2-0.4ppb – <i>NOTE: ppb is parts per billion – 1000ppb=1ppm</i>
Vapour Pressure	~30mmHg / ~4kPa (20°C / 68°F)
Evaporation Rate (<i>Butyl Acetate = 1</i>)	3.3
Vapour Density (air = 1)	3.5
Boiling Range	100°C / 212°F
Freezing Point	-71°C / -96°F
Specific Gravity	0.923 (20/20°C)
Water Solubility	15-20 grams per litre (20°C / 68°F)
Also soluble in	chloroform, alcohols, ethers and ketones
Viscosity	0.7 centipoise (20°C / 68°F)
pH	none – (<i>does not liberate hydrogen ions when dissolved</i>)
Conversion Factor	1ppm = 4.09mg/m ³
Molecular Weight	100grams per mole

6. FLAMMABILITY & FIRE FIGHTING

Flash Point	8°C / 46°F (closed cup)
Autoignition Temperature	355°C / 671°F
Flammable Limits	1.4% – 12.1%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part burnt hydrocarbon fragments & ethyl acrylate
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	may accumulate a static charge on agitation or pumping; ignition by static spark is possible

7. STABILITY / REACTIVITY

Dangerously Reactive With	strong oxidising agents – chlorine, perchlorates, peroxides; copper, iron, azo compounds, strong acids, strong alkalis, amines & moisture can all initiate hazardous polymerisation
Also Reactive With	attacks some plastics: ABS, PVC, epoxy & elastomers: butyl, nitrile, “Viton”, rubber & etc
Stability	stable in the presence of phenolic inhibitors and oxygen (together)
Decomposes in Presence of	heat, acidity, alkalinity, ultraviolet, - temperatures above 10°C may initiate polymerisation
Decomposition Products	none apart from Hazardous Combustion Products
Sensitive to Mechanical Impact	no

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8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL

ACGIH TLV	5ppm / 20mg/m ³
OSHA PEL	25ppm / 100mg/m ³
STEL	15ppm / 61mg/m ³
Ventilation	mechanical ventilation may be required to control airborne to regulated limits; consider handling & using ethyl acrylate in sealed equipment; have respirators with organic vapour cartridges available to all people working in the area for escape purposes, should equipment fail – <i>keep respirators in airtight containers (“Tupperware” or “Zip-Lock”) to maintain freshness</i>
Hands	polyvinyl alcohol, “Responder” gloves – <i>consult supplier to confirm suitability of alternatives</i>
Eyes	chemical safety goggles – <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 (preferably below 10°C / 50°F) in stainless steel (not mild steel) away from sources of ignition, heat and substances listed in Part 7 (above). Non-sparking bronze or aluminium hand tools must be used. All electrical and mechanical equipment (lighting, switchgear and forklift trucks) used with or around this product must be explosion-proof.

This product may retain a static charge on agitation or transfer from one container to another. 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.

This product may react with oxygen in the air to form explosive or flammable peroxides on prolonged storage. (**Shelf-life of 6 months.**) If storing for longer than a month, test product at regular intervals to ensure that an adequate concentration of polymerisation inhibitor is present. These include: *hydroquinone, hydroquinone methyl ether, dimethyl tert-butylphenol*. Phenolic inhibitors require the presence of oxygen. Recommended oxygen for storage is 6-8% – enough to ensure inhibitor potency, but low enough to prevent auto-oxidation. Ensure that containers are full and tightly sealed. 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.

The product vapour has no inhibitor so may polymerise. Check vents and spark arrestors regularly for accumulation of polymerised material. Clean as necessary to ensure proper venting and prevent pressurization of the containers.

Warning: the vapour pressure of ethyl acrylate is high. *This product really should be used in sealed equipment.* 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 all 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 , 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.

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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 and /or eliminated and cannot bioaccumulate
Biodegradation	this product degrades readily and rapidly in the presence of oxygen; 52% biodegrades in 2 weeks in the Japanese MITI test using an acclimated activated sludge
Abiotic Degradation	this product reacts with atmospheric hydroxyl radicals; its estimated half-life in air is 1.5 days
Mobility in soil, water	this product is water soluble and will move readily in soil and water
Aquatic Toxicity	
LC ₅₀ (Fish, 96hr)	2mg/litre (Cyprinodon variegatus), 2/5mg/litre (Pimephales promelas), 4.6mg/litre (Salmo gairdneri & Oncorhynchus mykiss), 10-22mg/litre (Leuciscus Idus)
EC ₅₀ (Crustacea, 48hr)	7.9mg/litre (Daphnia magna), 12mg/litre (Artemia salina)
EC ₅₀ (Algae, 72hr)	48mg/litre (Scenedesmus subspicatus)
EC ₅₀ (Bacteria)	46.8mg/litre (Nitrosomonas sp.), 1536mg/litre (Pseudomonas putida)

13. TRANSPORT REGULATIONS

Canada TDG	PIN	UN-1917
AND	Shipping Name	ethyl acrylate, stabilised
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# 205-438-8)

Immediately Dangerous to Life or Health: NIOSH has recommended that ethyl acrylate be treated as a potential human carcinogen.

Allowable Tolerances: Polymers of Acrylic Acid Esters/ are exempted from the requirement of a tolerance when used 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: 25 ppm (100 mg/cu m). Skin Designation. Vacated 1989 OSHA PEL TWA 5 ppm (20 mg/cu m); STEL 25 ppm (100 mg/cu m), skin designation, is still enforced in some states.

NIOSH Recommendations: NIOSH recommends that ethyl acrylate be regulated as a potential human carcinogen. NIOSH usually recommends that occupational exposures to carcinogens be limited to the lowest feasible concn.

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 5 ppm; 15 min Short Term Exposure Limit (STEL): 15 ppm; 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. Ethyl acrylate is produced, as an intermediate or a final product, by process units covered under this subpart.

State Drinking Water Guidelines: Florida 5,000 ug/l

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15. REGULATIONS (cont'd)

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; In the Washington D.C. metropolitan area (202) 426-2675. 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. Ethyl acrylate is included on this list.

RCRA Requirements: As stipulated in 40 CFR 261.33, when ethyl acrylate, 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).

FIFRA Requirements: /Polymers of acrylic acid esters/ are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.

FDA Requirements: Ethyl acrylate is a food additive permitted for direct addition to food for human consumption 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 b) 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. Homopolymers and copolymers of Ethyl acrylate are an indirect food additive for use only as a component of adhesives. Substances used in the manufacture of paper and paperboard products used in food packaging shall include /ethyl acrylate copolymers of itaconic acid or methacrylic acid/ for use only on paper and paperboard which is waxed. Under the conditions of normal use, these substances would not reasonably be expected to migrate to food, based on available scientific information and data.

16. PREPARATION INFORMATION

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

File Name: ethyl acrylate

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

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

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