Established in 1981 megaloid laboratories limited
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Safety Data Sheet

1. PRODUCT IDENTIFICATION

Name **Vinyl Acetate monomer**
Synonyms **1-acetoxyethylene; acetic acid, vinyl ester; ethanoic acid, vinyl ester; ethenyl acetate; ethenyl ethanoate**
CAS# **108-05-4**
Europe EC# **203-545-4**
Product Uses **monomer for vinyl polymers**

2. HAZARDS

Quick Guide: flammable liquid, heavy vapour may travel, distant ignition and flashback are possible, very reactive substance *highly dependent on maintenance of adequate inhibitor titre for stabilty*, vinyl acetate vapour contains no inhibitor so may polymerise dangerously; suspected carcinogen

Canada – WHMIS **B 2, D 1B, D 2A, (F)*** **** F only if uninhibited***
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,* ***F*** *– Reactive Substance*

U.S.A. – HMIS **Health – 3, Fire – 3, Reactivity – 2/3** (*if inhibitor is present*)
Key: ***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
1-acetoxyethylene	100%	10 / 35	1600	2300	1460

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	-8°C / 18°F (closed cup)
Autoignition Temperature	385°C / 725°F*; also 402°C / 756°F*
Flammable Limits	2.6% – 13.4%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments, including acetaldehyde (*carcinogen*) and acetic acid (*corrosive*)
Firefighting Precautions	foam, dry chemical, water fog, water spray only to cool & dilute, product floats on water – water jet spreads flames; firefighters must wear SCBA
Static Charge Accumulation	not known – low flash point requires caution – ground all appliances used in vicinity

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 below 40°C (104°F), away from sources of ignition, oxidising agents & substances listed in Part 10. *Storage over 6 months is not recommended*. Use non-sparking bronze or aluminum hand tools. All electrical & mechanical equipment (including lighting, switchgear and forklift trucks) used with or around this product must be explosion-proof.

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.

Ensure that containers are full & tightly sealed. Install pressure/vacuum venting on drums if there are not to be used soon. Empty containers may contain a flammable / explosive vapour. Always ensure that containers, whether empty or full, are tightly sealed unless in use. If stored longer than a month, check titre of inhibitor (*usually hydroquinone 3-20ppm; also diphenylamine or hydroquinone methyl ether*) regularly and replenish as necessary.

Note that vinyl acetate is far more volatile than its inhibitor, so vapour contains little or no inhibitor. The vapour may polymerise on storage tank vents, blocking them. ***At elevated temperature, high vapour concentration may polymerise explosively.***

Avoid breathing product vapour. Use with adequate ventilation. If dealing with a spill, and ventilation is impossible or impractical, wear an organic vapour respirator.

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	10ppm / 35mg/m^3	**Ontario STEV**	15ppm / 53mg/m^3
ACGIH TLV	10ppm / 35mg/m^3	ACGIH TLV-STEL	15ppm / 53mg/m^3
OSHA PEL	10ppm / 35mg/m^3	OSHA PEL-STEL	20ppm / 70mg/m^3

Ventilation	mechanical ventilation may be required to control airborne titre to regulated limits; engineering controls (eg: sealed apparatus, point source ventilation of vapour) are far preferable to either wearing a respirator or ventilation of the workplace
Hands	"Silver Shield", "Trellchem", or "Tychem" gloves – *consult supplier to confirm suitability or alternatives*
Eyes	safety glasses with side shields – *always protect the eyes*
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, irritating, fruity odour; lachrymator (causes tears)
Odour Threshold	0.4 – 0.6 – *prolonged exposure dulls the sense of smell – hence poor warning property*
Vapour Pressure	83mmHg / 11kPa (20°C / 68°F)
Evaporation Rate (*Butyl Acetate = 1*)	not known – approximately 6 (*rapid*)
Vapour Density (air = 1)	3
Boiling Range	73°C / 163°F
Freezing Point	-93°C / -136°F
Specific Gravity	0.932 (20/20°C)
Water Solubility	22 grams per litre (20°C / 68°F)
Also soluble in	most organic solvents
Viscosity	0.4centipoise (20°C / 68°F) – *thin, mobile liquid*
pH	none – (*does not liberate hydrogen ions when dissolved*)
Conversion Factor	1ppm = 3.51mg/m^3
Molecular Weight	86grams per mole

10. REACTIVITY

Dangerously Reactive With	strong oxidising agents, acids or alkalis; azo compounds, peroxides,
Also Reactive With	desiccants (eg: silica gel) react vigorously with vapour; alumina, various amines;
Stability	polymerises readily in absence of inhibitor; forms unstable peroxides on prolonged exposure to atmospheric oxygen
Decomposes in Presence of	warmth, moisture, acids, alkalis, ***absence or low titre of inhibitor***
Decomposition Products	apart from Hazardous Combustion Products, acetaldehyde & acetic acid
Sensitive to Mechanical Impact	no

11. TOXICITY

Effects, Acute Exposure

Skin Contact	may irritate – *rapid evaporation may be responsible for the low irritancy* severely irritating with blistering if contact is prolonged (*eg: soaked clothing*)
Skin Absorption	slight; no toxic effects likely by this route – *rapid evaporation limits absorption*
Eye Contact	may irritate – *irritancy of liquid limited by rapid evaporation;* vapour irritating above 10ppm ***NOTE:*** *The hydroquinone inhibitor contributes to eye irritancy.*
Inhalation	nose & throat irritation above 20ppm; difficult breathing, shortness of breath occur; *life threatening* *pulmonary oedema may occur at persistently high vapour concentration*
Ingestion	not known – *not a route of industrial exposure*

Effects, Chronic Exposure

General	prolonged exposure may cause dermatitis & skin cracking; years of inhalation of 5-10ppm by factory workers had no clinical effect; industrial exposure at 40ppm caused symptoms including impaired cardiac performance, lung function plus liver & nervous disorders
Sensitising	not a sensitiser in humans or animals
Carcinogen/Tumorigen	vinyl acetate is a possible human carcinogen (IARC 2B); an animal carcinogen (ACGIH A3)
Reproductive Effect	reproductive damage in male rats; no evidence for human effect
Mutagen	no known effect in animals; no evidence for human effect
Synergistic With	not known
LD_{50} (oral)	2900mg/kg (rat), 1600mg/kg (mouse),
LD_{50} (skin)	2300mg/kg (rabbit)
LC_{50} (inhalation)	3250-4100ppm (rat), 1460-1550ppm (mouse), 2500ppm (rabbit), 6200ppm (guinea pig)

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12. ECOLOGICAL INFORMATION

Bioaccumulation	rapidly eliminated (biological half-life = 48hr); not a bioaccumulator
Biodegradation	biodegrades readily & rapidly in the presence of oxygen; >50% in 5 days; 98% in 2 weeks in the Japanese MITI test
Abiotic Degradation with	reacts with atmospheric hydroxyl radicals; estimated ½-life in air is 14 hours; hydrolyses in water ½-life = 7 days; ½-life – 8-13 days in sunlit water – reaction with hydroxyl radicals
Mobility in soil, water	sufficiently water soluble to move readily in soil and water
Aquatic Toxicity	
LC_{50} (Fish, 96hr)	18mg/litre (Lepomis macrochirus), 42mg/litre (Carassium auratus), 31mg/litre (Lebistes reticulates), 15-39mg/litre (Pimephelas promelas – *several tests*)
EC_{50} (Crustacea, 48hr)	10mg/litre (Artemia salina), 52 & 330mg/litre (Daphnia magna – 24hr)
EC_3 (Algae)	370mg/litre (Scenedesmus quadricauda) – *this is an EC_3, not an EC_{50}*
EC_{50} (Bacteria)	690 & 1150mg/litre ("*anaerobic bacteria*"), 2080mg/litre (Photobacterium phosphoreum)
EC_3 (Bacteria)	6mg/litre (Pseudomonas putida), 35mg/litre (Microcystis aeruginosa)

13. DISPOSAL

Waste Disposal	**do not flush to sewer**, *waste containing an appreciable concentration of vinyl acetate monomer should only be handled by licensed hazardous waste 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. ***Never cut, drill, weld or grind on or near this container, even if empty***

14. TRANSPORT CLASSIFICATION

Canada TDG	**PIN**	**UN - 1301**
AND	**Shipping Name**	**vinyl acetate, 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	**Highly Flammable**
Europe Risk Phrases	**R: 11 –** *Highly flammable.*
Europe Safety Phrases	**S:16, 23, 29, 33 –** *Keep away from sources of ignition - No smoking. Do not breathe vapour. Do not empty into drains. Take precautionary measures against static discharges.*

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15. REGULATIONS, USA, cont'd

USA Regulations

NIOSH Recommendations: Recommended Exposure Limit: 15-Min Ceiling Value: 4 ppm (15 mg/cu m).

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 10 ppm; 15 min Short Term Exposure Limit (STEL): 15 ppm. A3; Confirmed animal carcinogen with unknown relevance to humans.

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. Vinyl acetate 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. Vinyl acetate is included on this list.

State Drinking Water Guidelines: Florida 250 ug/l

Clean Water Act Requirements: Vinyl acetate 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 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). Releases of CERCLA hazardous substances are subject to the release reporting requirement of CERCLA section 103, codified at 40 CFR part 302, in addition to the requirements of 40 CFR part 355. Vinyl Acetate Monomer is an extremely hazardous substance (EHS) subject to reporting requirements when stored in amounts in excess of its threshold planning quantity (TPQ) of 1,000 lbs.

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. Vinyl acetate is included on this list. Effective date 2/10/86; Sunset date: 2/10/96.

FDA Requirements: Vinyl acetate 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: ***February 2004*** *Revision Date*: ***February 2007, February 2010, February 2013***

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