METHACRYLATE PRODUCERS ASSOCIATION, INC.

GLOBAL PRODUCT SAFETY SUMMARY:
ETHYL METHACRYLATE

(Last Updated: 9/27/19)
Disclaimer

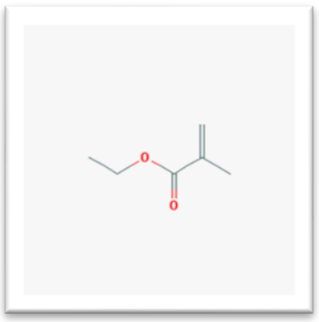
SUBSTANCE NAME

Ethyl Methacrylate

GENERAL STATEMENT

Ethyl Methacrylate (EMA) is produced for use by industry as a building block to make a wide range of polymer based products that we see and use every day from paints and coatings, toners and inks, to dental and medical products to name but a few. EMA in its current uses is of low concern to human health and the environment. It is classified as hazardous (highly flammable, irritant to skin and respiratory system and sensitizing by skin contact) but has been handled safely by industry and professionals for over 60 years. EMA-based polymers are inert in the environment and can be recycled, but more typically, are used for energy recovery.

CHEMICAL IDENTITY

Name:	Ethyl Methacrylate
Synonym:	Methacrylic acid, ethyl ester
CAS name	2-Propenoic acid, 2-methyl-, ethyl ester
CAS number(s):	97-63-2
IUPAC name:	Ethyl 2-methylprop-2-enoate
Molecular formula:	$C_6H_{10}O_2$ 

USES AND APPLICATIONS

EMA is produced for use by industry as monomer for the production of polymers. EMA is manufactured in industrial settings in closed systems and used by industry for manufacture of polymers in closed and semi-closed systems. Downstream use of EMA is almost exclusively in the form of polymer although some products used by professionals (DIY/hobbyists) may contain the liquid monomer. EMA monomer is used in some artificial nails; however, MPA member companies recommend against this use on the basis that EMA is a recognized skin sensitizer.

PHYSICAL/CHEMICAL PROPERTIES

The following table includes information, which refers to testing performed with the concentrated (liquid) monomer substance. It is not intended to be comprehensive or to replace information found in the Safety Data Sheet (SDS). A SDS may be obtained from one of the manufacturers.

Property	Value
Physical state	Liquid
Color	Colorless
Odor	Pungent
Density	0.91 g/cm^3 at 20 °C
Melting point	<-75 °C
Boiling point	118-119 °C at 1013 hPa
Flammability	Highly flammable
Explosive properties	Not explosive
Self-ignition temperature	400 °C
Vapor Pressure	20 hPa at 20 °C
Molecular Weight	114.1
Water solubility	469 mg/L at 20 °C
Flash point	18 °C at 1013 hPa
Octanol-water partition coefficient (Log Kow)	1.87 at 20 °C

HUMAN HEALTH SAFETY ASSESSMENT

Information for the general population and consumers handling products made with ethyl methacrylate.

Consumer
The majority of EMA is converted to polymers before being used in consumer products. Since these polymers typically contain extremely low levels of residual monomer, exposure to liquid EMA is unlikely. Some professional/DIY and hobbyist products may contain liquid EMA monomer. Direct skin contact with these products could produce skin irritation, and repeated contact could lead to skin sensitization (allergy or dermatitis). Inhalation of high levels of vapors may irritate the respiratory system.

Worker
EMA is produced in essentially closed systems so that significant worker exposure during monomer manufacture is unlikely. Workers may come into contact with EMA during polymer production and professional use of products containing liquid monomer. The health effects following skin contact or inhalation of the vapors would be the same as for the consumer.

The following table includes information for someone handling the concentrated (liquid) monomer) substance. The data, while verifiable, are not intended to be comprehensive nor replace the information found in the SDS.

Effect Assessment	Result
Acute Toxicity	Low toxicity after acute oral, dermal and inhalation exposure.
Irritation	Causes irritation to the skin and respiratory system. Not irritating to the eyes.
Sensitization	Sensitizing by skin contact. Click here for a technical summary. By weight of evidence, does not cause asthma.
Mutagenicity	Not mutagenic. Click here for a technical summary. No evidence of carcinogenicity. Click here for a technical summary.
Toxicity after repeated exposure	EMA can cause damage to the part of the nose responsible for detection of smell when consistently inhaled over a longer period of time. Other effects in the body are non-specific.
Toxicity for reproduction	Does not harm reproduction or cause birth defects at levels that are not toxic to the mothers. Click here for a technical summary.

ENVIRONMENTAL SAFETY ASSESSMENT

Based on available data, EMA is of low toxicity to aquatic organisms and is not classified as hazardous for the environment. EMA is fully and rapidly biodegradable. While EMA is not intentionally released during manufacturing processes and use, EMA released to air or trace amounts present in waste water streams would rapidly disappear by chemical and biological degradation. EMA does not possess significant ozone depletion potential.

The following tables include information for testing performed with the concentrated (liquid) monomer substance. Additional information may be obtained from the SDS supplied by the manufacturer.

Effect Assessment	Result
Aquatic Toxicity	Low toxicity to aquatic organisms.

Fate and behavior	Result
Biodegradation	Readily biodegradable
Bioaccumulation potential	Low
PBT / vPvB conclusion*	Does not meet criteria for PBT or vPvB classification
Environmental impact	Unlikely to persist in, or have significant impact on, the environment. Click here for a technical summary.

* Persistent/Bioaccumulative/Toxic (PBT) very Persistent-very Bioaccumulative (vPvB)

EXPOSURE

Consumer

Consumer exposure to EMA is generally limited to products containing polymers made with EMA. These polymers contain extremely low levels of residual monomer. Exposure of consumers to liquid monomer is therefore unlikely, unless they use professional, DIY or hobbyist products that contain significant levels of liquid monomer. In that case, exposure can occur if consumers have direct skin and/or nail contact with the liquid monomer. In addition, inhalation of vapors may be unintentional or unavoidable when using such products. Direct skin and/or nail contact in cosmetic (artificial nails) uses may be unavoidable and such use is not recommended.

Worker

EMA is produced in essentially closed systems; therefore, significant worker exposure during manufacture is unlikely. Workers may come into contact with EMA during polymer production and professional use of products containing liquid monomer.

RISK MANAGEMENT RECOMMENDATIONS

Consumer

For consumer use of products containing EMA-based polymers, risk management measures relating to the very low EMA residues in those polymers are not indicated. Use of professional, DIY and hobbyist products that contain liquid EMA monomer will require the user to follow the guidance provided by the product manufacturer on the packaging or product label. This will depend upon the product composition, but may include recommendations to avoid skin contact (to prevent skin irritating/sensitizing properties) and to provide good general ventilation (to prevent irritation of the respiratory system by high concentrations of the vapors) when handling the uncured (liquid, unpolymerized) product. To avoid clogging of drains and unintentional exposures, uncured (liquid, unpolymerized) product should not be poured down the drains or discarded in domestic waste. Any applications involving direct skin and/or nail contact with the liquid monomer that are not under the direct supervision of a medical or dental professional are not recommended (for further reference, see MPA's policy regarding the use of methacrylates in artificial nails).

Worker

As for any substance, workers should follow the recommended safety measures as provided by the manufacturer in the Safety Data Sheet. Considering the skin irritating and sensitizing properties of EMA, this typically will include avoiding skin contact or the wearing of suitable protective gloves and avoiding inhalation of high concentrations of vapor by use of one or more of the following: engineering controls, good general ventilation or personal protective (respiratory) equipment, depending upon the particular use conditions.

REGULATORY INFORMATION / CLASSIFICATION AND LABELLING

This substance is subject to a number of federal and international statutes and regulations. Selected U.S. regulatory information is available on the MPA website. Other federal, state and local regulations may apply.

This substance has been registered under the EU chemical control law known as REACH (Registration, Evaluation, Authorisation and Restriction of Chemical substances), and is listed on various chemical inventories. It has been reviewed under the OECD SIDS (Screening Information Data Set) program.

While the toxicological data are not specific to a particular region, the regulatory frameworks differ between countries and regions. The Global Harmonized System (GHS) attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. Under the GHS, substances are classified according to their physical, health, and environmental hazards.

Note: The hazard statements and symbols presented here refer to the hazard properties of the concentrated substance and are meant to provide a brief overview of the labelling for the substance. It is not intended to be comprehensive or to replace information found in the SDS.

Classification:

- Flammable liquid: Category 2
- STOT single exposure: Category 3
- Skin corrosion/irritation: Category 2
- Skin Sensitization: Category 1B

Labelling:
Signal word: Danger
Hazard pictogram:

GHS02:

GHS07: exclamation mark

Hazard statements:
H225: Highly flammable liquid and vapor.
H315: Causes skin irritation.
H317: May cause an allergic skin reaction.
H319: Causes serious eye irritation
H335: May cause respiratory irritation.

ADDITIONAL INFORMATION

Information on registered substance (ECHA)
https://echa.europa.eu/registration-dossier/-/registered-dossier/13871

OECD High Production Volume (HPV) SIDS)
https://hpvchemicals.oecd.org/ui/SIDS_Details.aspx?id=319e0a7e-feac-4468-824d-f9661b37a8ac

CONTACT

For further information on this substance or product safety summaries in general, please contact MPA. Click on the logos below to go to the company's website.

Glossary

Acute toxicity - harmful effects after a single exposure
Bioaccumulation - accumulation of substance in an organism
Biodegradation- chemical breakdown of substances by a physiological environment
Carcinogenicity - effects causing cancer
Concentrated - Non-formulated undiluted substance
ECHA – European Chemicals Agency
EU - European Union
GHS - Global Harmonized System
Hazard - situation bearing a threat to health and environment
HPV - High Production Volume
IUPAC – International Union of Pure & Applied Chemistry
Log Kow - Log Octanol-Water Partitioning Coefficient
Mutagenicity - effects that change genes
PBT/ vPvB - Persistent, Bioaccumulative and Toxic/very Persistent and very Bioaccumulative
OECD - Organisation for Economic co-operation and Development
REACH - Registration, Evaluation, Authorisation and Restriction of Chemical substances
SDS - Safety Data Sheet
Sensitizing - causes allergies
SIDS - Screening Information Data set
STOT – Specific Target Organ Toxicity

Disclaimer

This document is not intended to be comprehensive. It is provided solely as background information and should not substitute for an up-to-date Safety Data Sheet or research should specific regulatory or other legal questions arise. It is not intended to be a statement of legal requirements when using or handling acrylates. Although the information is believed to be accurate as of the last update, new information may become available and regulations frequently change, and no warranty, expressed or implied, is made concerning the contents. In addition, many states and localities adopt their own regulations, which are not covered by this summary or on the MPA website. In all events, the user should consult applicable laws and regulations, as well as their supplier's Safety Data Sheet, for current information and requirements. **NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN.**