Product Safety Assessment

Ethyl Acrylate

Select a Topic:
- Names
- Product Overview
- Manufacture of Product
- Product Description
- Product Uses
- Exposure Potential
- Health Information
- Environmental Information
- Physical Hazard Information
- Regulatory Information
- Additional Information
- References

Names
- CAS No. 140-88-5
- EC No. 203-438-8
- Ethyl-2-propenoate
- Acrylic acid, ethyl ester
- Ethyl ester acrylic acid
- Ethyl propenoate
- 2-Propenoic acid, ethyl ester

Product Overview
- Ethyl acrylate is used in the production of coatings and inks, adhesives, sealants, plastics and elastomers. See Product Uses.
- Acrylic esters, including ethyl acrylate, have a very strong, unpleasant odor that may be bothersome. However, the smell of acrylates does not necessarily indicate a health risk. Ethyl acrylate is an eye and skin irritant. Prolonged contact of liquid or vapor with eye or skin could result in injury. Ethyl acrylate can be absorbed through the skin in potentially harmful amounts and can cause an allergic skin reaction. Vapors can be toxic, and vapor exposure could result in irritation to upper respiratory tract and lungs. Ethyl acrylate has a low oral toxicity, but can cause burns to mouth and throat, and irritation to the gastrointestinal tract. See Health Information.
- Consumer exposure to ethyl acrylate is unlikely. Those working with ethyl acrylate in manufacturing operations could be exposed during maintenance, sampling, testing, manual transfer, or other procedures. See Exposure Potential.
- Ethyl acrylate is a flammable liquid and vapor. Its vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ethyl acrylate vapors present an explosion hazard. See Exposure Potential and Physical Hazard Information.
- Ethyl acrylate is stable under recommended storage conditions. Elevated temperatures can cause hazardous polymerization, so ethyl acrylate has inhibitors added to reduce the probability of polymerization. See Product Description and Physical Hazard Information.

Manufacture of Product
- Capacity—The Dow Chemical Company (and its consolidated subsidiaries) is one of the largest global producers of ethyl acrylate and related chemicals, acrylic acid and esters. However, there are many global producers. Dow has production sites in Texas and Germany.
Product Safety Assessment: Ethyl Acrylate

- **Process** – Ethyl acrylate is normally produced by reacting *acrylic acid* with ethanol, which produces water as a byproduct. The reaction is shown below:

\[
\begin{align*}
\text{Acrylic acid} & \quad \text{Ethanol} \\
\text{Ethyl acrylate} & \quad \text{Water}
\end{align*}
\]

\[
\begin{align*}
\text{H}_2\text{C}=\text{HC}=\text{O} & \quad + \quad \text{C}_2\text{H}_5\text{OH} & \quad \rightarrow \quad \text{H}_2\text{C}=\text{HC}=\text{OC}_2\text{H}_5 \\
& & \quad + \quad \text{H}_2\text{O}
\end{align*}
\]

Product Description

Ethyl acrylate is a colorless liquid with a sharp odor. It is readily miscible with most organic solvents. Ethyl acrylate contains one of the following three inhibitors to prevent polymerization under recommended storage conditions:

- **Hydroquinone (HQ)** – CAS 123-31-95
- **Monomethyl ether of hydroquinone (MEHQ)**, 10 to 1100 ppm – CAS 150-76-5
- **Phenothiazine** – CAS 1236-99-3

Product Uses

Acrylate esters, the family of chemicals to which ethyl acrylate belongs, is primarily used as a reactive building block to produce coatings and inks, adhesives, sealants, textiles, plastics and elastomers. Specifically, ethyl acrylate is used in the following applications:

- **Adhesives** – for use in construction and pressure-sensitive adhesives
- **Chemical intermediates** – for a variety of chemical products
- **Coatings** – for textiles and adhesives, and for surface and water-based coatings, and coatings used for paints, leather finishing and paper
- **Leather** – to produce different finishes, particularly nubuck and suede
- **Plastics** – for the manufacture of a variety of plastics

Exposure Potential

Ethyl acrylate is used in the production of industrial and consumer products. Based on these uses, the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in an ethyl acrylate manufacturing facility or in the various industrial or manufacturing facilities that use ethyl acrylate. It is produced, distributed, stored and consumed in closed systems. Acrylates should always be handled in well ventilated areas.\(^5\) Those working with ethyl acrylate in manufacturing operations could be exposed during maintenance, sampling, testing, manual transfer, or other procedures. Each manufacturing facility should have a thorough training program for employees, appropriate work processes and safety equipment in place to limit unnecessary ethyl acrylate exposure. Preferred glove barrier materials include chlorinated polyethylene, polyethylene, ethyl vinyl alcohol laminate (EVAL), polyvinyl alcohol (PVA), or styrene/butadiene rubber. Consult the relevant Safety Data Sheet (SDS) or see Health Information.

- **Consumer exposure to products containing ethyl acrylate** – Dow does not sell ethyl acrylate for direct consumer use, but it is used as a raw material to make a variety of goods used by consumers or construction personnel and could be present in trace amounts as residual monomer in consumer products, including paints. See Health Information.

- **Environmental releases** – An acrylate leak, signaled by its strong odor, rarely poses any health risks.\(^5\) Evacuate the area and stay upwind of the spill. Ventilate the area of leaks or spills. Only trained and properly protected personnel should be involved in clean-up operations. Eliminate all sources of ignition in vicinity of the spill or released vapor to avoid
fire or explosion. Ground and bond all containers and handling equipment. Use appropriate safety and protective equipment. Absorb with non-combustible material such as dirt or sand. Do not use clay absorbants. Consult the relevant Safety Data Sheet (SDS) for more information about protective equipment and procedures. See Environmental, Health and Physical Hazard Information.

- **Large release** – Industrial spills or releases are infrequent and are generally contained. If a large spill does occur, dike the area to contain the spill. Keep spilled material away from soil, ditches, sewers, waterways and groundwater. Ground and bond all containers and handling equipment and avoid all ignition sources. Pump with explosion-proof equipment. If available, use foam to smother or suppress vapors. Warn the public of downwind explosion hazards. Ethyl acrylate may float on water and any runoff may create an explosion or fire hazard. The material should be captured, collected and reprocessed, or disposed of according to applicable governmental requirements. For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus (SCBA) or positive-pressure air line with auxiliary self-contained air supply. Follow emergency procedures carefully. See Environmental, Health and Physical Hazard Information.

**Back to top**

**Health Information**

Acrylic esters, including ethyl acrylate, have a very strong, unpleasant odor that may be bothersome. However, the smell of acrylates does not necessarily indicate a health risk. Acrylic esters have an extremely low odor “threshold,” meaning that even very small amounts in the air can be detected by smell. In fact, ethyl acrylate can be detected by smell at levels of 1.2 parts per billion.

Ethyl acrylate liquid may cause severe eye irritation or severe corneal damage. Vapors cause eye irritation with mild discomfort and redness.

Brief contact may cause moderate skin irritation with local redness and swelling. Prolonged or widespread skin contact may result in skin burns. Prolonged skin contact is unlikely to result in absorption of harmful amounts. Skin contact may cause an allergic skin reaction as ethyl acrylate has demonstrated the potential for contact allergy in mice.

Excessive exposure to ethyl acrylate vapors may cause severe irritation to upper respiratory tract (nose and throat) and lungs. Vapor concentrations are attainable that could be hazardous on single exposure.

Ethyl acrylate has low toxicity if swallowed. It may result in gastrointestinal irritation or ulceration. Swallowing ethyl acrylate may result in burns of the mouth and throat.

**Cancer Information**

An increased incidence of stomach tumors was seen in animals given daily oral doses of ethyl acrylate. Tumors were judged to result from irritation. Long-term studies by more relevant routes of exposure (skin, inhalation) were negative. Workers exposed during 1933-1945 to very high vapor concentrations of ethyl acrylate and methyl methacrylate, and to volatile by-products of the ethyl acrylate/methyl methacrylate polymerization process, showed an increase in deaths due to colorectal cancer. Such increases were not observed in workers exposed after that time. Although suggestive, these findings do not establish a causal relationship between high level exposure to these acrylates and colorectal cancer. Ethyl acrylate is listed as a possible carcinogen by the International Agency for Research on Cancer (IARC). In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were predominantly negative.
For specific health information, review the Safety Data Sheet (SDS).

Environmental Information

The bioconcentration potential for ethyl acrylate is low. It is readily biodegradable (OECD 310/ISO 14593 test: 80-90% biodegraded after 28 days), which suggests that the compound will be removed from water and soil environments, including biological wastewater-treatment facilities.

Ethyl acrylate is moderately toxic to aquatic organisms. Efforts should be made to keep spills from contaminating nearby soil, ditches, sewers, waterways and groundwater.

Physical Hazard Information

Ethyl acrylate is a flammable liquid and vapor. Ethyl acrylate should be kept away from heat, sparks, flame and any sources of ignition. Its vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur.

Fire Fighting Instructions

Should ignition occur, extinguish with water fog or fine spray, dry chemical fire extinguisher, carbon dioxide fire extinguisher, or foam. Alcohol-resistant foams (ATC type) are preferred.

- Personal protection for fire fighters should include positive-pressure, self-contained breathing apparatus (SCBA) and protective fire-fighting clothing includes fire fighting helmet, coat, trousers, boots, and gloves.
- Avoid contact with this material during fire-fighting operations. If contact is likely, change to full chemical-resistant fire-fighting clothing with self-contained breathing apparatus (SCBA). If this is not available, wear full chemical-resistant clothing with SCBA and fight fire from a remote location.

Reactivity/Stability

Ethyl acrylate is stable under recommended storage conditions. Elevated temperatures can cause hazardous polymerization. Polymerization can be initiated by the absence of air, the presence of free radical initiators and peroxides, or high temperature. The presence of moisture can also accelerate polymerization rate.

Ethyl acrylate contains inhibitors to minimize polymerization under recommended storage conditions. See Product Description or SDS. Maintain inhibitor and dissolved oxygen level. Uninhibited monomer vapors can polymerize and plug relief devices.

Avoid unintended contact with activated carbon or silica gel, which may cause polymerization. Avoid contact with clay-based absorbants, and with incompatible materials, such as:

- Oxidizing materials
- Aldehydes, amines, ayes, ethers, free radical initiators, halides, mercaptans, mineral acids, peroxides, rust, strong inorganic bases
- Metals such as brass or copper

Additional physical property information for ethyl acrylate is available on the Safety Data Sheet (SDS).
Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use and/or disposal of ethyl acrylate. These regulations may vary by city, state, country or geographic region. Information may be found by consulting the relevant SDS or Contact Us.

Additional Information

- Safety Data Sheet
- Ethyl Acrylate, Technical Data Sheet, The Dow Chemical Company, Form No. 745-00108-1004-AA
- The Basic Acrylic Acid Monomers Manufacturers’ website (www.bamm.net)
- The European Basic Acrylic Monomer Group (http://www.petrochemistry.net/?HID=62)
- Health Effect Assessments of the Basic Acrylates, CRC Press, 1993

For more business information about ethyl acrylate, visit the DOW Acrylic Monomers web site.

References

3 Ethyl Acrylate, Safety Data Sheet for the US, The Dow Chemical Company
5 Ethyl Acrylate 15 PPM MEHQ, Safety Data Sheet for the US, The Dow Chemical Company
6 Ethyl Acrylate, Technical Data Sheet, The Dow Chemical Company, Form No. 745-00107
8 DOW Acrylates website: Applications (www.dow.com/acrylates/app/index.htm)

NOTICES

As part of its 2015 Sustainability Goals, Dow has committed to make publicly available safety assessments for its products globally. This product safety assessment is intended to give general information about the chemical (or categories of chemicals) addressed. It is not intended to provide an in-depth discussion of health and safety information. Additional information is available through the relevant Safety Data Sheet, which should be consulted before use of the chemical. This product safety assessment does not replace required communication documents such as the Safety Data Sheet.

The information herein is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Dow be
Product Safety Assessment: Ethyl Acrylate

responsible for damages of any nature whatsoever resulting from the use of or reliance upon the information herein or the product to which that information refers.

Nothing contained herein is to be construed as a recommendation to use any product, process, equipment or formulation in conflict with any patent, and Dow makes no representation or warranty, express or implied, that the use thereof will not infringe any patent.

NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Dow makes no commitment to update or correct any information that appears on the Internet or on its World-Wide Web server. The information contained in this document is supplemental to the Internet Disclaimer, www.dow.com/homepage/term.asp.

Back to top

Form No. 233-00297-MM-1214X