Product Safety Assessment
*Methyl Acrylate*


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**Names**
- CAS No. 96-33-3
- Methyl-2-propenoate
- Methyl propenoate
- EC No. 202-607-8
- Methyl acrylate
- Acrylic acid, methyl ester
- Methyl acrylate
- Methyl ester acrylic acid

**Product Overview**
- Methyl acrylate is a colorless volatile liquid with an acrid odor. For further details, see Product Description.
- Methyl acrylate is used in the production of coatings, elastomers, adhesives, thickeners, surfactants, fibers, plastics, textiles and inks. For further details, see Product Uses.
- Consumer exposure to methyl acrylate is unlikely. Those working with methyl acrylate in manufacturing operations could be exposed during maintenance, sampling, testing, manual transfer, or other procedures. For further details, see Exposure Potential.
- Acrylic esters, including methyl acrylate, have a very strong, unpleasant odor that may be bothersome. However, the smell of acrylates does not necessarily indicate a health risk. Methyl acrylate is an eye and skin irritant. Prolonged contact of liquid or vapor with eye or skin could result in injury. Methyl 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. Methyl acrylate has a low oral toxicity, but can cause burns to mouth and throat and irritation to the gastrointestinal tract. For further details, see Health Information.
- Methyl acrylate released to the air will be degraded by reaction with photochemically-produced hydroxyl radicals. Laboratory tests indicate methyl acrylate is readily biodegradable in the environment including removal by wastewater treatment facilities. This material is considered moderately toxic to aquatic organisms. For further details, see Environmental Information.
- Methyl 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. DOW™ methyl acrylate is stable under recommended storage conditions. Elevated temperatures can cause hazardous polymerization, so DOW methyl acrylate has inhibitors added to reduce the probability of polymerization. For further details, see Physical Hazard Information.
Manufacture of Product

- **Capacity** – The Dow Chemical Company (and its consolidated subsidiaries) is one of the largest global producers of methyl acrylate and related chemicals, acrylic acid and esters. However, there are many global producers. Dow has production sites in Mexico.
- **Process** – DOW™ methyl acrylate is normally produced by reacting **acrylic acid** with methanol, which produces water as a byproduct. The reaction is shown below:

  \[
  \text{Acrylic acid} + \text{CH}_3\text{OH} \rightarrow \text{Methyl acrylate} + \text{H}_2\text{O}
  \]

Product Description

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

- Monomethyl ether of hydroquinone (MEHQ, 10 to 400 ppm) – CAS 150-76-5
- Phenothiazine (~1 ppm) – CAS 1236-99-3

Product Uses

Acrylate esters, the family of chemicals to which methyl acrylate belongs, is primarily used as a reactive building block to produce coatings and inks, adhesives, sealants, textiles, plastics and elastomers. Specifically, methyl 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
- **Textiles** – in the manufacture of both woven and non-woven textiles
- **Water Treatment** – to produce dimethylaminoethylacrylate (DMAEA), which is used as a monomer to make flocculants for water treatment

Exposure Potential

DOW methyl 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 a methyl acrylate manufacturing facility or in the various industrial or manufacturing facilities that use methyl acrylate. It is produced, distributed, stored and consumed in closed systems. Acrylates should always be handled in well ventilated areas. Those working with methyl 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 methyl 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 methyl acrylate** – Dow does not sell methyl 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. In the event of a spill, the focus is on containing the spill to prevent contamination of soil, ditches, sewers, or surface or ground water. 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 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. Contain the spilled material if possible and keep it out of sewers. For large releases, warn the public of downwind explosion hazards. 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. 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 – including confined or poorly ventilated areas – 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.

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**Health Information**

Acrylic esters, including methyl 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, methyl acrylate can be detected by smell at levels of 3-20 parts per billion.

Methyl acrylate liquid and vapors may cause severe eye irritation with permanent corneal damage. Exposure to methyl acrylate vapors can cause tears.

Brief contact may cause severe skin irritation with pain, local redness, and tissue damage. Prolonged or widespread skin contact may result in absorption of harmful amounts and may cause an allergic skin reaction.

Excessive exposure to methyl acrylate vapors may cause serious irritation to upper respiratory tract (nose and throat) and lungs. Vapor concentrations are attainable that could cause serious adverse effects on single exposure, even death.

Methyl acrylate has low toxicity if swallowed. It may result in gastrointestinal irritation or ulceration. Swallowing methyl acrylate may result in burns of the mouth and throat. If it is swallowed, do not induce vomiting.

Methyl acrylate does not cause birth defects in laboratory animals.
In vitro genetic toxicity studies were negative in some cases and positive in other cases. Animal genetic toxicity studies were predominantly negative.

For more information, request the relevant Safety Data Sheet.

Environmental Information

Methyl acrylate is a volatile chemical (evaporates easily) and unlikely to persist in the environment. It is not expected to bind to soil or sediment. Methyl acrylate released to air will undergo degradation by photochemically-produced hydroxyl radicals within days.

Methyl acrylate is not expected to accumulate in the food chain (bioconcentration potential is low). Its simulated biodegradation rate in laboratory testing is high.

Methyl acrylate is moderately toxic to aquatic organisms.

For more information, request the relevant Safety Data Sheet.

Physical Hazard Information

Methyl acrylate is a flammable liquid and vapor. Methyl 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

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

DOW methyl acrylate contains inhibitors to minimize polymerization potential under recommended storage conditions. See Product Description or Safety Data Sheet. Maintain inhibitor and dissolved oxygen level (5 to 21% oxygen). 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
- Alcohols aldehydes, amines, free radical initiators, halides, mercaptans, mineral acids, peroxides, rust, strong inorganic bases
- Metals such as brass or copper
For more information, request the relevant Safety Data Sheet.

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**Regulatory Information**

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

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**Additional Information**

- The Basic Acrylic Acid Monomers Manufacturers’ website ([www.bamm.net](http://www.bamm.net))
- The European Basic Acrylic Monomer Group ([http://www.petrochemistry.net/?HID=62](http://www.petrochemistry.net/?HID=62))
- Health Effect Assessments of the Basic Acrylates, CRC Press, 1993

For more business information about DOW™ methyl acrylate, visit the DOW Acrylate Monomers web site at [www.dow.com/acrylates](http://www.dow.com/acrylates).

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**References**

4. “Methyl Acrylate CASRN 96-33-3,” Hazardous Substances Databank (HSDB), U.S. National Library of Medicine, TOXNET system, Environmental Fate and Exposure section pages 1–4.

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