Product Safety Assessment  
*Methyl Methacrylate Monomer*


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**Names**
- CAS No. 80-62-6
- EC No. 201-297-1
- Methyl methacrylate
- Methyl methacrylate monomer
- Methacrylic acid, methyl ester
- 2-Methyl-propenoic acid, methyl ester
- Methyl 2-methylpropenoate

**Product Overview**
- Methyl methacrylate is a clear liquid with a fruity odor.\(^1\) For further details, see [Product Description](#).
- Methyl methacrylate is used almost exclusively in the production of methyl methacrylate polymers or copolymers, which are used in the manufacture of acrylic sheets and molds, clear plastics, extrusion powders, acrylic surface and paper coatings, latex paints, printing inks, floor polishes, dental restorations, adhesive cements, and surgical implants.\(^2\) For further details, see [Product Uses](#).
- Dow methyl methacrylate monomer is sold for industrial use only. Occupational exposure is possible at a manufacturing facility, during transport, or at facilities using this material to manufacture other products. Workplace exposure is minimized through engineering controls and the use of personal protective equipment. Consumers may contact this material in trace amounts by using certain products that are manufactured from it. Dow does not sell methyl methacrylate for any application that would involve implantation in the human body or prolonged contact with internal body fluids or tissues.\(^3\) For further details, see [Exposure Potential](#).
- Methyl methacrylate may cause slight eye irritation or moderate skin irritation. It is considered a skin sensitizer; allergic reactions may result from contact. Inhalation of vapor or mist can cause irritation of the nose, throat, and lungs and can be fatal in high concentrations. Prolonged or repeated overexposure has been reported to affect the kidneys, liver, gastrointestinal tract, nervous system and lung.\(^1\) For further details, see [Health Information](#).
- Methyl methacrylate is moderately toxic to aquatic organisms on an acute basis. The bioconcentration potential (tendency to accumulate in the food chain) is low. If released to surface water, methyl methacrylate will readily biodegrade. A portion may evaporate to the air. It will not persist in the environment.\(^3\) For further details, see [Environmental Information](#).
Methyl methacrylate is a reactive chemical that must be stored and handled with care. It is stable under recommended storage conditions. Heat can cause polymerization. Inhibitor is added to methyl methacrylate monomer to prevent polymerization. For the inhibitor to be effective, the oxygen concentration in the vapor space must be at least 5%. Store material in containers made of stainless steel, carbon steel, glass, or aluminum. Avoid contact with acids, bases, oxidizing agents, reducing agents, UV light (ultraviolet light, which is found in sunlight), free-radical initiators, and organic peroxides. For further details, see Physical Hazard Information.

Manufacture of Product
- **Capacity** – The Dow Chemical Company produces methyl methacrylate in facilities at Deer Park, Texas, USA.
- **Process** – Methyl methacrylate is produced by reacting acetone cyanohydrin with concentrated sulfuric acid, forming the corresponding methacrylate sulfate, which is subsequently reacted with methanol to form methyl methacrylate.

Product Description
Methyl methacrylate monomer is a clear liquid with a fruity odor. It belongs to a class of chemicals known as esters of methacrylic acid. Methyl methacrylate is typically 99.9% pure and contains small amounts of inhibitor to retard polymerization.

Product Uses
Dow™ methyl methacrylate monomer is used in the production of methyImethacrylate polymers and copolymers, which are used in the manufacture of acrylic sheets and molds, clear plastics, extrusion powders, acrylic surface and paper coatings, latex paints, printing inks, adhesive cements, and floor polishes. Methyl methacrylate is also used as a starting material to manufacture other esters of methacrylic acid.

Dow does not sell methyl methacrylate monomer for artificial fingernail (acrylic nail) applications, dental restorations, dental adhesives, dental prosthetics, surgical implants, or for any application that would result in implantation or prolonged contact within the human body.

Exposure Potential
Dow™ methyl methacrylate monomer is used in the production of industrial and consumer products. Based on the uses for this material, the public could be exposed through:
- **Workplace exposure** – Exposure can occur either in a methyl methacrylate manufacturing facility, during transport, or in the various industrial or manufacturing facilities that use this material. It is produced, distributed, stored, and consumed in closed systems. Those working with methyl methacrylate in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. Workers can minimize the potential for exposure by carefully following workplace procedures and wearing the proper protective equipment. See Health Information.
- **Consumer exposure to products containing methyl methacrylate monomer** – Dow does not sell methyl methacrylate monomer for direct consumer use, but it is used to make products handled by consumers, such as shatter-resistant glazing materials and acrylic paints. Residual levels of methyl methacrylate monomer in consumer products would be very
low and significant contact is unlikely. Always read the product information before use and follow the label/use instructions. Acrylic and methacrylic polymers are used safely in a wide variety of personal-care and hygiene products. Dow does not sell methyl methacrylate for artificial finger nail (acrylic nail) applications, dental adhesives, dental restoration, dental prosthetics, surgical implants, or for any application that would result in implantation or prolonged contact within the human body. See Health Information.

- **Environmental releases** – In the event of a spill, the focus is on containing the spill to prevent contamination of soil and surface or ground water. Methyl methacrylate is ultimately biodegradable under aerobic conditions, and it will be removed by wastewater-treatment facilities. The bioconcentration potential (tendency to accumulate in the food chain) is low. It would not persist if released to the environment. It is slightly toxic to aquatic organisms on an acute basis. See Environmental and Physical Hazard Information.

- **Large release** – Because methyl methacrylate remains in closed systems during manufacture and use, industrial spills or releases are infrequent and generally contained. If a spill occurs, eliminate sources of ignition immediately. Only properly trained and equipped personnel should attempt to isolate or contain the spill. Use only explosion-proof equipment and ground and bond all equipment. Wear approved self-contained breathing apparatus (SCBA) and full protective clothing. Contain spills with inert materials such as sand or earth. Contaminated monomer may be unstable. Add inhibitor to prevent polymerization. Absorbent can act as a contaminant and remove inhibitor from liquid methyl methacrylate. Avoid freestanding methyl methacrylate with absorbent and add inhibitor to stabilize. Dispose of according to applicable governmental requirements. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Deny any unnecessary entry into the area and consider the use of unmanned hose holders. Use water fog or spray, dry-chemical or carbon-dioxide extinguishers, or foam to fight the fire. Alcohol-resistant foam is preferred. Use of a direct water stream may spread the fire. Vapors are heavier than air and may travel a long distance and accumulate in low-lying areas. Ignition or flash back is possible. Keep vapors out of sewers. Heat can cause rapid polymerization, evolving much more heat. Heated containers can explode. Immediately withdraw all personnel from the area in case of rising sounds from venting safety device or discolorations of the container. Firefighters should wear self-contained, positive-pressure breathing apparatus (SCBA) with an approved full-face mask and full chemical-resistant firefighting clothing. Contain fire-water run-off if possible to reduce the potential for environmental damage. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

For more information, request the Safety Data Sheet from the Dow Customer Information Group.

**Health Information**

- **Eye contact** – Contact can cause slight eye irritation.

- **Skin contact** – Contact can cause moderate skin irritation. Methyl methacrylate can be a skin sensitizer. Contact may result in allergic reactions.

- **Inhalation** – Inhalation of vapor or mist can cause irritation of the nose, throat, and lungs. Inhalation of high concentrations of vapor or mist is harmful, and possibly fatal.

- **Ingestion** – This material may be harmful if swallowed.

- **Repeated exposure** – In animal tests, prolonged or repeated overexposure resulted in irritation to the nasal tract and damage to respiratory and olfactory epithelium as well as potential adverse effects on the liver and kidney.
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**Other** – Mutagenicity, carcinogenicity, reproductive, and developmental toxicity tests have been negative. Based on these test results, there is no concern for cancer or reproductive or developmental toxicity.

For more information, request the Safety Data Sheet from the [Dow Customer Information Group](https://www.dow.com).

**Environmental Information**

Methyl methacrylate monomer has limited solubility in water and evaporates easily. If released, it would not persist in the environment. If released to the atmosphere, methyl methacrylate would photodegrade rapidly in sunlight. If released to water, it would float and eventually biodegrade under aerobic conditions, or evaporate. If released to soil, the portion that does not evaporate would biodegrade. Small amounts of residual methyl methacrylate in wastewater will biodegrade in common wastewater-treatment processes. It is slightly toxic to aquatic organisms on an acute basis. The bioconcentration potential (tendency to accumulate in the food chain) is low and potential for mobility in soil is high. Methyl methacrylate is a hazardous air pollutant (HAP), is listed in SARA Title III Section 313, and has a CERCLA reportable quantity of 454 kilograms (1,000 pounds).

For more information, request the Safety Data Sheet from the [Dow Customer Information Group](https://www.dow.com).

**Physical Hazard Information**

Dow™ methyl methacrylate is stable under recommended storage conditions. This material can undergo rapid polymerization, and an uncontrolled polymerization may produce a rapid release of energy in the form of heat, with the potential of an explosion of closed containers. It contains an inhibitor to stabilize against polymerization during shipment and storage. Do not store this material in an oxygen-free environment. The effectiveness of the inhibitor is dependent on the presence of dissolved oxygen. To maintain sufficient dissolved oxygen in the liquid, the monomer must be stored with an oxygen concentration of 5% or more in the vapor space. Hazardous polymerization could occur not only by depletion of inhibitor or lack of sufficient oxygen, but by overheating, or the presence of corrosion or chemical contaminants. Store this material in a cool place out of direct sunlight. Product stability during storage depends on inhibitor type and inhibitor concentration.

Avoid contact with acids, bases, oxidizing agents, reducing agents, UV light (sunlight), free-radical initiators, and organic peroxides.

For more information, request the Safety Data Sheet from the [Dow Customer Information Group](https://www.dow.com).

**Regulatory Information**

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of Methyl methacrylate monomer. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant [Safety Data Sheet](https://www.dow.com), [Technical Data Sheet](https://www.dow.com), or [Contact Us](https://www.dow.com).

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Additional Information

- Safety Data Sheet (http://www.dow.com/webapps/msds/msdssearch.aspx)
- Contact Us (www.dow.com/assistance/thoughts.htm)
- International Programme on Chemical Safety (IPCS) INCHEM website, November 2003 (www.inchem.org/documents/icsc/icsc/eics0300.htm)
- Methacrylates Sector Group, Association of Petrochemical Producers in Europe (APPE) (http://www.mpausa.org/safe-storage-handling/)
- Methacrylic Esters: Safe Handling Guidelines, Methacrylate Producers Association

For more information on methyl methacrylate, visit the Methacrylate Monomers web site at www.dow.com/products/product_line_detail.page?product-line=1000051.

References

1 Methyl Methacrylate Material Safety Data Sheet, The Dow Chemical Company.
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.

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