

Health Advisory: Information on Methyl Methacrylate (MMA)

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What Has Happened

A hazardous materials incident in Garden Grove has led to mandatory evacuation orders due to the potential release of Methyl Methacrylate (MMA)—a highly flammable and potentially toxic chemical commonly used in plastics, coatings, and manufacturing.

Evacuation boundaries were established using modeling scenarios to ensure public safety that include modeling of a potential on-site explosion. **Everyone within the designated evacuation zone is urged to comply with these orders until authorities confirm it is safe to return.**

Emergency teams are focused on keeping the liquid MMA stored in the special enclosed tanks in a stable temperature range to prevent further reaction and vapor production. Cooling and containment operations are ongoing. Air quality officials have deployed multiple stationary and mobile air monitors and have not detected any contaminants in the air to date.

Exposure is not expected as long as evacuation orders are followed. If you are exposed to MMA, you may or may not develop health effects. Those with underlying medical conditions or experiencing symptoms such as shortness of breath, throat or eye irritation or vomiting may need to be seen by a medical professional. Call the [California Poison Control System](#) at 1-800-222-1222 if you are experiencing symptoms and need to speak with an expert about how to proceed.

What is methyl methacrylate (MMA)?

Methyl methacrylate (MMA) is a clear, highly reactive organic compound that has a sharp, fruity smell.

MMA is dangerous because it is toxic, flammable, and under certain conditions, can begin to react with itself in a process called polymerization. This reaction can generate heat and pressure, which may cause liquid to vaporize and be released into the air. If

temperatures rise or MMA is not properly contained or handled, the vapors may also ignite or explode.

Because of these hazards, MMA is generally stored in special enclosed containers or tanks to limit vapor release and ignition risk. It is typically shipped or stored with an inhibitor to slow unwanted polymerization. These types of precautions and equipment are needed because vapors, heating, or runaway polymerization (a rapid, uncontrolled chemical reaction when a liquid MMA monomer suddenly reacts with itself very fast and gives off heat, causing more reaction, a rise in pressure in the closed container, vaporization of MMA, which creates a risk of fire or explosion) can create significant dangers.

How is methyl methacrylate (MMA) used?

MMA is widely used to manufacture a range of shatter-resistant acrylic materials such as Plexiglas, as well as a variety of resins coatings, and adhesives. MMA is also used by dentists to make dental materials such as crowns and fillings as well as by surgeons to make bone cement for some orthopedic procedures.

What can happen during an explosion involving methyl methacrylate (MMA)?

In an explosion, MMA can be released into the air as a gas, but MMA can also react to form additional hazardous compounds. An explosion could also cause secondary fires and explosions from the generation of heat, fire, flying debris, and the spread of heavy, combustible vapor clouds.

Release of large amounts of MMA in gas form is dangerous – the best way to stay safe is to keep away from the site of a release. Most consumer grade respiratory protective equipment (such as face masks or N95 respirators) will **not** provide protection from MMA.

What can happen during a spill involving methyl methacrylate (MMA)?

MMA quickly evaporates to a gas if released as a liquid. Once in the air it will react or break down quickly into other chemicals (likely half-life in atmosphere of hours / within a day in warm conditions).

Any methyl methacrylate that makes its way into the ground, and does not evaporate, may move through the ground (poor soil absorption expected) and enter groundwater. MMA is soluble in water but is degraded in the water within hours to days. MMA can also evaporate from the soil or water when it is exposed to air.

Release of MMA in liquid form is dangerous – the best way to stay safe is to keep away from the site of a release. Do not touch liquid MMA or inhale vapor.

How do I know if I have been exposed to MMA?

When MMA is released as a gas, inhalation exposure is most likely if nearby, though dermal exposure is also possible (MMA can easily move through most clothing and consumer gloves).

Many people can smell MMA at very low levels, *often well before it reaches harmful levels*, so odor can be an early warning. However, do not rely only on smell alone for safety. Odor does not tell you how much MMA is in the air, and vapors can build up quickly in enclosed or poorly ventilated spaces. The only reliable way to know your exposure level is to follow reports of the air concentration conducted by local authorities. There is no medical test that can measure MMA in the body.

To reduce exposure risk:

- Follow evacuation or safety instructions to minimize risk of inhalation of MMA.
- Wash skin and clothing thoroughly after any potential contact.

What health effects are anticipated from short-term exposure to methyl methacrylate (MMA)?

Exposure is typically via inhalation, but dermal exposure is possible from contact with liquid MMA or if MMA vapor condenses onto skin. For most individuals in communities near an accidental spill or release, inhalation of vapors is likely.

Most exposures to MMA occur in occupational settings. From worker exposures, there is some information on anticipated human health effects from short-term exposure at various levels. Extra care should be taken by those who are pregnant to minimize MMA exposure as MMA can affect a developing fetus.

Respiratory effects from breathing MMA:

Breathing MMA can irritate the lungs and nose/throat. Respiratory symptoms include coughing, wheezing, chest tightness, and/or shortness of breath (dyspnea). High exposures can cause severe shortness of breath and a build-up of fluid in the lungs (pulmonary edema). At very high levels, there are potentially life-threatening respiratory effects.

Neurologic effects from breathing MMA:

Breathing MMA can cause symptoms such as headache, lightheadedness, dizziness, drowsiness, fatigue/ lethargy, sensation of heaviness in arms and legs, difficulty concentrating, reduced memory, and numbness/tingling in extremities.

Skin Effects from contact with liquid MMA or condensation of MMA vapor onto skin:

Contact can cause irritation to skin, eyes, mucous membranes. Symptoms include itching, burning, redness, swelling, and cracking of the skin. Allergic responses are also possible. People with existing neurological problems, young children, older adults and people with lung or heart disease may be more easily affected by MMA. Pregnant people should avoid or minimize exposure.

If someone feels unsteady, very sleepy, confused, or has trouble breathing, move them to fresh air and call emergency services.

Those with underlying medical conditions or experiencing symptoms such as shortness of breath, throat or eye irritation or vomiting may need to be seen by a medical professional. Call the [California Poison Control System](https://www.cdph.ca/Programs/CID/DCDC/Pages/Immunizations/Prevention/Control/CaliforniaPoisonControlSystem.aspx) at 1-800-222-1222 if you are experiencing symptoms and need to speak with an expert about how to proceed.

References

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4. [Hazard Evaluation System and Information Service \(HESIS\) Fact Sheet \(1990\) \(PDF\)](#)
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6. NIOSH: Pocket Guide to Chemical Hazards: <https://www.cdc.gov/niosh/npg/npgd0426.html>
7. US EPA Interim AEGL: [Methyl methacrylate Results -AEGL Program | US EPA](#)

8. US EPA IRIS Summary Methyl methacrylate: [Methyl methacrylate \(CASRN 80-62-6\) | IRIS | US EPA](#)
9. Health Canada: [Hazardous substance assessment - Methyl methacrylate](#)