Material Safety Data Sheet

METHYL METHACRYLATE - STABILIZED
(chemically stabilized)

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSDS Number</td>
<td>0022</td>
</tr>
<tr>
<td>CAS Number</td>
<td>80-62-6</td>
</tr>
<tr>
<td>Formula</td>
<td>CH2C(CH3)COOCH3</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>100.12</td>
</tr>
<tr>
<td>CAS Name</td>
<td>2-METHYL-2-PROPENOIC ACID, METHYL ESTER</td>
</tr>
</tbody>
</table>

Trade names and Synonyms

- METHYL METHACRYLATE MONOMER
- MMA
- 2-METHYL-2-PROPENOIC ACID, METHYL ESTER
- METHYL 2-METHYL-2-PROPENOATE
- METHACRYLIC ACID, METHYL ESTER

Company Identification

MANUFACTURER/DISTRIBUTOR
LUCITE INTERNATIONAL, Inc.
7275 Goodlett Farms Parkway
Cordova, TN 38016-4909

PHONE NUMBERS
Product Information : 1-800-4-LUCITE
Transportation Emergency : 1-800-424-9300
Medical Emergency : 1-877-886-2143

# COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>*METHYL METHACRYLATE</td>
<td>80-62-6</td>
<td>~100</td>
</tr>
</tbody>
</table>

Standard grades contain inhibitors from among the following: 4-8000 (ppm)

- HYDROQUINONE 123-31-9
- p-METHOXYPHENOL 150-76-5
- 2,4-DIMETHYL-6-t-BUTYLPHENOL 1879-09-0
- OCTADECYL 3,5-DI-TERT-BUTYL-4-HYDROXYCINNAMATE 2082-79-3
- PHENOTHIAZINE 92-84-2
HAZARDS IDENTIFICATION

************EMERGENCY OVERVIEW**********************
* Flammable. Hazardous polymerization may occur. Irritant by *
* inhalation, in contact with skin and eye and if swallowed. *
* May cause sensitization by skin contact. Colorless liquid *
* with acrid, penetrating odor.                                    *
************************************************************************

Potential Health Effects:

EYE: Liquid and vapors can cause moderate irritation (tears, blurred vision and redness).

SKIN: May cause skin irritation. Can cause skin sensitization.

INGESTION: Causes irritation, a burning sensation of the mouth, throat and gastrointestinal tract and abdominal pain.

INHALATION: High concentration is irritant to the respiratory tract and may cause dizziness, headache and anesthetic effects.

CHRONIC (CANCER) INFORMATION: Prolonged and/or repeated exposure may lead to kidney, lung, liver, and heart damage. Unlikely to present a cancer hazard to man.

TERATOLOGY (BIRTH DEFECT) INFORMATION: Developmental toxicity observed in animal tests but only at levels toxic to the mother.

REPRODUCTIVE INFORMATION: No information available but no adverse reproductive effects are anticipated.

FIRST AID MEASURES

First Aid:
INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SKIN CONTACT: In case of contact, immediately wash skin with soap and water. Wash contaminated clothing before reuse.

EYE CONTACT: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

INGESTION: If swallowed, do not induce vomiting. Immediately give 2 glasses of water. Never give anything by mouth to an unconscious person. Call a physician.

FIRE FIGHTING MEASURES

* Regulated as a Toxic Chemical under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.
Flammable Properties:

Flash Point: 11.5 deg. C

Flammable limits in Air, % by Volume:
  lower limit: 2.1
  upper limit: 12.5

Autoignition temperature: 421 deg. C
Fine mists are explosive below the flash point.
Flammable liquid. Vapor forms explosive mixture with air.

Fire and Explosion Hazards: Sealed containers exposed to elevated temperatures may rupture explosively due to polymerization. Vapors are heavier than air and may travel to ignition sources and flash back.

Extinguishing Media: Foam, Dry Chemical, and CO2. Water spray (by trained personnel).

Fire Fighting Instructions: Keep personnel removed and upwind of fire. Wear self-contained breathing apparatus. Wear full protective equipment. Cool tank/container with water spray. Fight fire from a distance, heat may rupture containers.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)
NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean up.

Evacuate personnel, thoroughly ventilate area, and use self-contained breathing apparatus.

Initial Containment: Remove source of heat, sparks, flame, impact, friction or electricity. Dike spill. Prevent material from entering sewers, waterways, or low areas

Spill Clean Up: Soak up with sand, oil dry or other absorbent, non-combustible material. Cleaned-up material is a RCRA Hazardous Waste.

HANDLING AND STORAGE

Handling (Personnel): Do not breathe vapor or mist. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling.

Handling (Physical Aspects): Close container after each use. Ground container when pouring. Keep away from heat, sparks and flames.

Storage: Vapors are uninhibited and may form polymers in vents or flame arresters, resulting in blockage of vents.

Keep container in a cool place. Do NOT expose to direct sunlight. Store in a well ventilated place. Keep container tightly closed. Store in accordance with National Fire Protection Association recommendations. Maintain air space inside storage containers. Inhibitor requires air
(oxygen) contact to function. Check inhibitor levels after 6 months and return to original level.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Keep container tightly closed. Observe label precautions. Use ventilation that is adequate to keep employee exposure to airborne concentrations below exposure limits.

Personal Protective Equipment:

EYE/FACE PROTECTION: Wear safety glasses. Wear coverall chemical splash goggles and face shield when possibility exists for eye and face contact due to splashing or spraying material.

RESPIRATORS: A NIOSH/MSHA approved air-purifying respirator with an organic vapor cartridge or canister may be permissible under certain limited circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air purifying respirators is limited. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection.

PROTECTIVE CLOTHING: Wear impervious clothing to prevent ANY contact with this product, such as gloves, apron, boots, or whole body suit. Nitrile rubber is better than PVC.

Exposure Guidelines
Exposure Limits
METHYL METHACRYLATE
PEL (OSHA) : 100 ppm, 8 Hr. TWA
TLV (ACGIH): 50 ppm, 8 Hr. TWA; 100 ppm, 15 min. STEL

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Mobile liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Clear, colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Characteristic strong and acrid odor</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>0.5 - 1 ppm</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>100.5 deg. C at 760 mm/Hg</td>
</tr>
<tr>
<td>Melting Point</td>
<td>-48 deg. C</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>28 mm/Hg at 20 deg. C</td>
</tr>
<tr>
<td>Density</td>
<td>0.949 g/ml at 15.5 deg. C</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>1.6 WT% (20 deg. C)</td>
</tr>
<tr>
<td>Solubility (Other)</td>
<td>Miscible with most organic solvents</td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>1.38</td>
</tr>
<tr>
<td>Vapor Density (Air 1)</td>
<td>3.5</td>
</tr>
</tbody>
</table>

STABILITY AND REACTIVITY

Chemical Stability: Unstable with heat.

Incompatibility with Other Materials: Incompatible with oxidizing and
reducing agents. Material is a strong solvent and can soften paints and rubber.
Decomposition: Decomposes with heat. Hazardous gases/vapors produced are carbon monoxide, carbon dioxide and smoke.

Other Hazards:

Polymerization: Polymerization can occur. Conditions leading to polymerization are excessive heat, storage in absence of inhibitor, and inadvertent addition of catalyst. See MONO-001 (Additional Information and References Section lists full title) for details on inhibitors and storage stability. Contamination of product may also cause hazardous polymerization.

**TOXICOLOGICAL INFORMATION**

**ANIMAL DATA:**

Inhalation 4 hour LC50: 7093 ppm in rats (Very low toxicity by inhalation)
Dermal LD50: > 35,500 mg/kg in rabbits (Very low toxicity by contact)
Oral LD50: 7900 mg/kg in rats (Very low toxicity by ingestion)

Inhalation:
Irritating to respiratory system. High atmospheric concentrations may lead to irritation of the respiratory tract, dizziness, headache and anesthetic effects.
Skin Contact:
May cause sensitization by skin contact. Irritating to skin. Repeated and/or prolonged contact may cause dermatitis.
Eye Contact:
High vapor concentration will cause irritation.
Ingestion:
Low oral toxicity but ingestion may cause irritation of the gastrointestinal tract.

Long Term Exposure:
Repeated exposure to high levels produces adverse effects on the heart, lungs, liver and kidneys.
Repeated exposure of animals by inhalation to levels at or above the occupational exposure level produces adverse effects on the nasal epithelium (levels of 100 and 400 ppm).
There is no reason to believe that methyl methacrylate represents a carcinogenic or mutagenic hazard to man based upon evidence from well conducted animal studies, relevant mutagenicity studies and adequate epidemiologist studies in relevant cohorts.
Recent studies in animals have shown that high exposures do not produce embryo or fetotoxic nor tetratogenic effects in the presence or maternal toxicity.
None of these effects are likely to occur in humans provided exposure is maintained at or below the occupational exposure limit.

**ECOLOGICAL INFORMATION**

Environmental Fate and Distribution:
High tonnage material produced in wholly contained systems. Liquid with moderate volatility. Sparingly soluble in water. Product has low potential
for bioaccumulation. The product is predicted to have high mobility in soil.

Persistence and Degradation: Not readily biodegradable. Chemical Oxygen Demand (COD) 88% (28 days). Inherent Biodegradation: Dissolved Organic Carbon Removal (DOC removal) >95% (28 days).

Toxicity: Low toxicity to fish. LC50 (fish): Typically > 100 mg./L. LC50 (fathead minnow) (96 Hr.) (static) 130 mg./L.

Harmful to aquatic invertebrates. EC50 (Daphnia Magna) (48 Hr.) 69 mg./L.

Low toxicity to algae. EC50 (Selenastrum Capricornutum) (96 Hr.) 170 mg./L.

NOEC (zebra fish) (35 day) (flow through) 8.4 mg./L.

Effect on Effluent Treatment: Product is substantially removed in biological treatment processes.

DISPOSAL CONSIDERATIONS

Waste Disposal:
Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations. Do not flush to surface water or sanitary sewer system. Incinerate material in accordance with Federal, State/Provincial and Local requirements. Do not incinerate in closed containers. Do not allow material to contaminate ground water systems.

TRANSPORTATION INFORMATION

Shipping Information

DOT
Proper Shipping Name : METHYL METHACRYLATE MONOMER, STABILIZED
Hazard Class : 3
I.D. No. (UN/NA) : UN1247
Packing Group : II
Reportable Quantity : 1,000 lb.

Shipping Containers
If material is shipped in quantities greater than 1000 lb. per container, the Proper Shipping Name is RQ METHYL METHACRYLATE MONOMER, STABILIZED.

TGD
Proper Shipping Name : METHYL METHACRYLATE MONOMER, STABILIZED
TGD Class : 3.2 (9.2)
I.D. No. (UN/NA) : UN1247
TMD Packing Group : II

REGULATORY INFORMATION

U.S. Federal Regulations
TSCA Inventory Status : Reported/Included.
Superfund reportable discharge = 1000 lb.
TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312
Acute: Yes
Chronic: No
Fire: Yes
Reactivity: Yes
Pressure: No

Canadian Regulations:
DSL: included.
F: dangerously reactive material.

European Regulations: EINECS: all chemical listed.

EEC Classification: HIGHLY FLAMMABLE AND IRRITANT
Hazard Symbols: F, Xi
Risk Phrases:
R11. Highly flammable.
R37/38. Irritating to eyes, respiratory system and skin
R43. May cause sensitization by skin contact.
Safety Phrases:
S24. Avoid contact with skin.
S37. Wear suitable gloves.
S46. If swallowed, seek medical advice immediately and show this container or label.

OTHER INFORMATION

Additional Information

NA = Not Applicable
NE = Not Established
# = Indicates updated section

NFPA, NPCA-HMIS
NFPA Rating
Health : 2
Flammability : 3
Reactivity : 2

NPCA-HMIS Rating
Health : 2
Flammability : 3
Reactivity : 2

Personal Protection rating to be supplied by user depending on use conditions.

See MONO-001, Methyl Methacrylate Storage and Handling Bulletin for details on inhibitors and storage stability. Available from: LUCITE

STATE RIGHT-TO-KNOW LAWS

No substances on the state hazardous substances list, for the states indicated below, are used in the manufacture of products on this Material Safety Data Sheet, with the exceptions indicated. While we do not specifically analyze these products, or the raw materials used in their manufacture, for substances on various state hazardous substances lists, to the best of our knowledge the products on this Material Safety Data Sheet contain no such substances except for those specifically listed below:
SUBSTANCES ON THE PENNSYLVANIA HAZARDOUS SUBSTANCES LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (0.01% FOR SPECIAL HAZARDOUS SUBSTANCES): Methyl Methacrylate.

WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER: None known.

WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM: None known.

SUBSTANCES ON THE NEW JERSEY WORKPLACE HAZARDOUS SUBSTANCE LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (0.1% FOR SUBSTANCES IDENTIFIED AS CARCINOGENS, MUTAGENS OR TERATOGENS): Methyl Methacrylate.

MEDICAL USE: CAUTION: DO NOT USE IN MEDICAL APPLICATIONS INVOLVING IMPLANTATION IN THE HUMAN BODY.

LUCITE has not performed clinical testing on the suitability of acrylic products in any medical application and is not aware of any data relating to the compatibility of LUCITE’s products, or devices manufactured from them, for such applications. LUCITE’s products are not designed or manufactured for use in implantation in the human body or for prolonged contact with internal body fluids or tissues. LUCITE has neither sought, nor received, approval from the FDA or any other agency for the use of these acrylic materials in implantation in the human body or for prolonged contact with internal body fluids or tissues.

Methacrylate monomers are used safely in a wide variety of applications including some areas of personal hygiene. We are aware of some reports suggesting that use of methacrylate monomers in fingernail extension applications may result in loosening or shedding of the nails of the user as well as respiratory or other effects in those exposed to high levels of the vapors. LUCITE has performed no technical or clinical testing and has no data to support the use of methacrylate monomers in this application. Under no circumstances should methacrylate monomers be used in this or similar applications.

The information herein is given in good faith but no warranty, expressed or implied, is made. LUCITE INTERNATIONAL assumes no responsibility for personal injury or property damage that may arise from use of this material. Vendees or users assume all risks associated with the use of this material.

Responsibility for MSDS:

MSDS Coordinator
LUCITE INTERNATIONAL, Inc.
2665 Fite Road
Memphis, TN 38127
901-354-1082