



SAFETY DATA SHEET Product, SDS No. : MMA, M-001 (Rev.03)

1. IDENTIFICATION OF THE SUBSTANCE OR MIXTURE AND OF THE MANUFACTURER

PRODUCT IDENTIFIER

PRODUCT NAME : Methyl Methacrylate (MMA)

OTHER IDENTIFIER

CAS NO. : 80-62-6
UN NO. : 1247
EC / EINECS NO. : 201-297-1
RTECS NO. : OZ5075000
EC INDEX : 607-035-00-6

OTHER RECOMMENDATION FOR USAGE

Data not applicable.

MANUFACTURER DATA

NAME : PTT Asahi Chemical Company Limited.
ADDRESS : Marketing & Sales Dept. 555/1, Energy Complex, Building A,
8th Floor, Vibhavadi-Rangsit Road, Chatuchak, Bangkok 10900
THAILAND.
TELEPHONE NUMBER : +66-(0)2791-2405

EMERGENCY TELEPHONE NUMBER

EMERGENCY TELEPHONE NUMBER : +66-(0)3897-4800
ADDRESS : 8 Phangmuang Chapoh 3-1 Road , Huaypong,
Muang , Rayong 21150 THAILAND.

2. HAZARDS IDENTIFICATION

GHS CLASSIFICATION :

PHYSICAL HAZARD

- Flammable Liquids : Category 2

HEALTH HAZARDS

- Skin Corrosion / Irritation : Category 2 , Irritation
- Serious Eye Damage / Eye Irritation : Category 2A , Irritation

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- Respiratory or skin sensitization
 - Respiratory Sensitizer : Category 1
 - Skin Sensitizer : Category 1
- Reproductive Toxicity : Category 2
- Specific target organ toxicity following Single exposure
 - Respiratory Irritation, Anesthetics : Category 3
- Specific target organ toxicity following Repeated exposure
 - Nervous system, respiratory system : Category 1

ENVIRONMENTAL HAZARDS

- Acute Toxicity to the aquatic environment : Category 3

GHS LABEL ELEMENTS :



SIGNAL WORD : Danger

HAZARD STATEMENT :

- Flammable Liquid/Vapor.
- Fatal if inhaled (Vapor).
- Skin irritation.
- Serious eye irritation.
- May cause allergy, asthma, breathing difficulty.
- May cause an allergic skin reaction.
- May cause respiratory irritation, drowsiness and dizziness if inhaled.
- Causes damage to central nervous system and respiratory system through prolonged or repeated exposure.
- Toxic to aquatic life.

PRECAUTIONARY STATEMENTS :

[Prevention]

- Do not handle until all safety precautions have been read and understood.
 - Do not handle until all manuals and procedures have been read and understood.
 - Do not eat, drink, or smoke when using this product.
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- Keep container tightly closed.
- Keep away from heat / sparks / ignition sources.
- Use explosion-proof electrical/ventilating/lighting equipments.
- Take precautionary measures against static discharge.
- Wear personal protective equipments and use ventilating equipments to avoid an exposure.
- In case of inadequate ventilation, wear respiratory protection.
- Wear protective gloves/protective clothing / eye protection/face protection.
- Use in only outdoors or in a well-ventilated area.
- Do not breathe fume / mist / vapor / spray.
- Wash hands thoroughly after handling.
- Contaminated work clothing should not be allowed out of the workplace.
- Avoid release to the environment.

[Response]

- In case of fire : Wear protective mask and use dry chemical or foam for extinction.
- IF INHALED : Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- IF IN EYES : Rinse cautiously for more than 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
- IF ON SKIN: Wash the affected skin with plenty of water.
- Take off contaminated clothing immediately.
- Wash contaminated clothing adequately before reuse.
- If exposed or concerned: Get medical advice / attention.
- If exposed or feel unwell: Get medical advice / attention.
- If experiencing respiratory symptoms: Get medical advice / attention.
- If skin irritation or rash occurs: Get medical advice / attention.

[Storage]

- Keep container tightly closed. Store in well-ventilated place.

[Disposal]

- Entrust the dispose of contents/containers to authorized waste management firms in accordance with regulations of local authorities.

OTHER HAZARDS OUTSIDE THE GHS CLASSIFICATION : Data not available.

3. COMPOSITION / INFORMATION ON INGREDIENTS

CHEMICAL IDENTITY	: Methyl Methacrylate
COMMON NAME / SYNONYM	: Methacrylic Acid Methyl Ester, MMA
CHEMICAL FORMULA	: $\text{CH}_2=\text{C}(\text{CH}_3)\text{COOCH}_3$
MOLEULAR WEIGHT	: 100.1
CAS NO. AND OTHER IDENTIFIER	
CAS NO.	: 80-62-6
UN NO.	: 1247
EC / EINECS NO.	: 201-297-1
IMPURITIES AND STABILIZING ADDITIVES	: Stabilizing Agent

4. FIRST-AID MEASURES

INHALATION	: Move the victim to fresh air. Keep warm by blanket and rest in a position comfortable for breathing. Get medical attention immediately. If breathing stopped or breathing difficulties, loosen the buttons and rest in a position comfortable for breathing and give artificial respiration. Get medical attention immediately.
SKIN CONTACT	: Take off all contaminated clothing and shoes. Wash the affected skin with plenty of water. Get medical attention immediately.
EYE CONTACT	: Rinse cautiously with flowing water for more than 15 minutes. Get medical attention immediately (use fingers to open the eyes and rinse) Remove contact lenses, if present and easy to do, and continue rinsing.
INGESTION	: If the victim is conscious, induce vomiting. Get medical attention immediately. If unconscious, get medical attention immediately.
SIGNIFICANT SYMPTOMS :	
EYE	: Reddening and eye pain.
SKIN	: Reddening on affected skin and sensitization to allergic skin.

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INHALATION : It may cause cough, sore throat, headache, drowsiness, breathe difficulty, faint.

DIGESTION : It may cause dizziness and vomiting.

PRECAUTIONS FOR INDIVIDUAL PERFORMING EMERGENCY MEASURES :

Never give an artificial respiration by mouth-to-mouth. Use specific tools to give artificial respiration.

PRECAUTION FOR MEDICAL TREATMENT :

When seeking medical attention by a doctor, provide this SDS and other information regarding this material.

5. FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA : Dry Chemical Power, Extinguishing Foam, CO2 and Dry sand.

PROHIBITED EXTINGUISHING MEDIA : Water spray in cylindrical shape.

SPECIFIC HAZARDS WHEN IGNITED : Wear protective equipments to protect inhalation of generated MMA gas.

SPECIAL PROTECTION EQUIPMENT AND PRECAUTIONS FOR FIRE FIGHTER:

- Fire fighting shall be done from upwind side.
- Fire fighter must wear appropriate fire fighting suit and equipment.
(Refer to ITEM 8 : EXPOSURE CONTROL / PERSONAL PROTECTION)
- Specific Fire Fighting Method.
 - In case of fire in early stage, use dry chemical/CO2/dry sand for fire extinction.
 - In case of major fire or large quantity, use extinguishing foam and cut off Oxygen. Spraying water in cylindrical shape may be effective in controlling fire spread, but may cause danger too.

6. ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS , PROTECTION EQUIPMENTS AND EMERGENCY RESPONSE :

- Enclose the released area , and control of the entrance into the area.
- Response shall be done from upwind side.
- Wear appropriate Protection Equipments.

(refer to ITEM 8 EXPOSURE CONTROL / PERSONAL PROTECTION)

ENVIRONMENTAL PRECAUTIONS : Avoid discharge to sewers or natural waters.

METHOD OF CONTAINMENT AND CLEANING UP :

- For small spill, absorb with dry sand / chemical absorbent and clean up. Place in an appropriate waste disposal container and close tightly.
- For large spill, dike with dry sand or chemical absorbent , and divert the spill to safe area then collect.
- Clean up the contaminated area after collected.

SECONDARY FIRE PREVENTION :

- Extinguish all potential ignition sources from area immediately.
- Prevent the release into the sewage system , ground water pit , and basement or into any closed construction.

7. HANDLING AND STORAGE

SAFE HANDLING PRECAUTION :

- Wear appropriate protective clothing.
(refer to ITEM 8 EXPOSURE CONTROLS / PERSONAL PROTECTION)
- Remove potential ignition sources, static electricity, sparks, flame in vicinity.
- Do not handle violently such as striking against the container until it collapses or falls.
- Take the safety measures to prevent static electrical accidents. Use electro-conductive suit and shoes.
- Wash hand thoroughly after handling. Take of contaminated clothing.
- Keep container tightly closed. Handle in well-ventilated place.
- Beware the release of mist or vapor.
- Use explosion-proof container/equipment. Take the safety measures against static discharge.

SAFETY MEASURE FOR STORAGE :

- Store away from incompatible substances such as Oxidizing agents.
 - Store under each country's regulations.
 - Use explosion-proof container/equipment. Take the safety measures against static discharge.
 - Store in closed container. Keep in cool and well-ventilated place.
 - In case of tank storage, store at temperature not exceeding 30°C (or not exceeding 20°C if possible).
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- Store away from heat / sparks / ignition sources.
- In case of tank storage, spray water in summer time to prevent overheat.
- Keep in closed metal container such as iron, stainless, etc.

INCOMPATIBILITY : Store away from incompatible substances such as strong acid, alkali , oxidizing agents.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

CONTROL PARAMETER :

ACGIH	TLV- TWA	: 50 ppm (205 mg/m ³)
	TLV- STEL	: 100 ppm (410 mg/m ³)

ENGINEERING PROTECTION CONTROL :

In case of closed area or indoors, the sources of vapor should be sealed or closed tightly, or Local Exhaust Ventilator should be installed.

Provide Emergency shower, hand washing, eye washing at the vicinity and indicate the location by signs remarkably.

PERSONAL PROTECTIVE EQUIPMENTS :

Respiratory Protection	: Mask for Organic Gasses (Canister must be a type of organic gasses. In case of high concentration, use air-supplied respirator such as air-line mask or SCBA).
Eye Protection	: Goggles (if possibility of chemical spread out, use face protection)
Protective Clothing	: Rubber Gloves (Butyl Rubber) and impermeable and electrostatic-proof chemical suit and long rubber boots.



9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	: Colorless and Transparent Liquid. ¹⁾
ODOR	: Slight ester odor.
ODOR THRESHOLD LIMIT	: 0.085 ppm ¹⁷⁾
pH	: 7 (Neutral)
MELTING POINT / FREEZING POINT	: -48°C ¹⁾
INITIAL BOILING POINT AND BOILING RANGE	: 101°C ¹⁾
FLASH POINT	: 10°C (Closed) ¹⁾
EVAPORATION RATE	: 3.1 (Butyl acrylate=1) ¹⁸⁾
FLAMMABILITY (SOLID,GAS)	: Not applicable
UPPER/LOWER FLAMMABILITY OR EXPLOSIVE LIMITS	: LEL 2.1 vol.% UEL 12.5 vol.% ¹⁾
VAPOR PRESSURE	: 4.6 kPa (20°C) ²⁾
VAPOR DENSITY (AIR = 1)	: 3.45 ²⁾
RELATIVE DENSITY (WATER = 1)	: 0.944 (20°C/4°C) ²⁾
SOLUBILITY	: 1.59 % (Water , 20°C) ²⁾ , Solubilized by Alcohol , Ether ⁴⁾
PARTITION COEFFICIENT : N-OCTANOL / WATER	: log Pow = 1.38 ¹¹⁾
AUTO-IGNITION TEMPERATURE	: 421°C ²⁾
DECOMPOSITION TEMPERATURE	: Data not available
VISCOSITY	: 0.58 mPa • s

10. STABILITY AND REACTIVITY

REACTION : No data.

STABILITY : Stable when added Polymerization Inhibitor and handled in normal condition.

POSSIBILITY OF HAZARDOUS REACTION :

- Possibility of fire if in contact Oxidizing Agent.
- Possibility of Polymerization Reaction if in contact with sunlight or high temperature.

CONDITIONS TO AVOID : High temperature condition, direct sunlight, long storing.

INCOMPATIBLE MATERIALS : Oxydizing agent, strong acid substances.

HAZARDOUS DECOMPOSITION PRODUCTS : Methacrylic, Methyl Alcohol.

11. TOXICOLOGICAL INFORMATION

ACUTE TOXICITY :

- Oral - Rat LD₅₀ (Median Lethal Dose) = 7,872 ~ 9,400 mg/kg ¹⁰⁾
- Dermal - Rat LD₅₀ (Median Lethal Dose) = 7,088 mg/kg ¹⁰⁾
- Inhale(vapor) - Rat LC₅₀ (Median Lethal Concentration) = 3,760 ppm/8h ,
= 7,093 - 19,046 ppm/4h ¹⁰⁾

It has a report of dizziness, disturbance of consciousness in human when exposed the substance at 50~100 mg/m³ for 20-90 minutes. ¹⁰⁾

SKIN CORROSION / IRRITATION : Moderate skin irritation on rabbit's skin. ¹⁰⁾

SERIOUS EYE DAMAGE / IRRITATION : Slight or moderate irritation on rabbit's eyes. ¹⁰⁾

RESPIRATORY OR SKIN SENSITIZATION : It has the evidences of sensitization in animals. ¹¹⁾

GERM CELL MUTAGENICITY (MUTATION) :

Giving the substance by oral to mouse 125 mg/kg /day x 4days, or giving a single exposure at 250 mg/kg, an abnormality on chromosome or increase of micronucleus neither was nor recognized. The abnormality of chromosome at marrow was not recognized too. ¹⁰⁾

CARCINOGENICITY : Methyl Methacrylate is ranked as A4 by ACGIH

ACGIH (American Conference of Governmental Industrial Hygienists) ,

A4 = Not Classifiable as Human Carcinogen.

REPRODUCTIVE TOXICITY :

When exposed the substance at the high concentration of 26,800 ppm, found the decreasing of body weight, cephalic setae, or delayed ossification in rat's embryos. ¹⁰⁾

SPECIFIC TARGET ORGAN TOXICITY FOLLOWING SINGLE EXPOSURE :

It has a report of symptoms of respiratory irritation, asthenia, fever, headache, dizziness, vomit, drowsiness, etc. in human when exposed the substance at 48 - 480 ppm for 20-90 minutes. ¹⁰⁾

SPECIFIC TARGET ORGAN TOXICITY FOLLOWING REPEATED EXPOSURE :

Found the symptoms of headache, limb pain, weariness, sleep disorder, loss of memory, etc. in the person who handling Methyl Methacrylate. From 50 workers who exposed repeatedly for 10~26 years, it has a report of chest pain, arrhythmia, cardiac dilatation, abnormality on electrocardiogram. ¹⁰⁾

ASPIRATION HAZARD : Classification not possible.

12. ECOLOGICAL INFORMATION

ECOLOGICAL TOXICITY :

- Fish : Bluegill LC₅₀ (Median Lethal Concentration) = 191 mg/L/96h ¹⁰⁾
- Other aquatic life : Daphnia EC₅₀ (Median Effective Concentration) = 69 mg/L/48h ¹⁰⁾
: Selenastrum EC₅₀ (Median Effective Concentration) = 170 mg/L/96h ¹⁰⁾

PERSISTENCE / DEGRADABILITY

- Favorable decomposition by microorganism.
- Degradation calculated from BOD 94%

(Testing Period 2 weeks, Activated Sludge Concentration; 30 mg/L) ¹⁰⁾

BIOACCUMULATIVE POTENTIAL : Bio Concentration Factor (BCF) ; 2.3 ⁶⁾

MOBILITY IN THE SOIL : No data.

OTHER ADVERSE EFFECTS : No data.

13. DISPOSAL CONSIDERATIONS

WASTE RESIDUES :

- Dispose the residue in accordance with the standards of local authority and related regulations / laws.
- Entrust the dispose to authorized waste management firms in accordance with local / regional / national / international regulations.
- Disposal shall be done by Incineration or Activated Sludge Process.



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- (1) Incineration : Waste oil, waste water, sludge which is contaminated by Methyl Methacrylate shall be disposed by feeding into incinerator and incineration directly, or incinerate by mixing with flammable solution.
- (2) Activated Sludge : Valid to the dilute solution of Methyl Methacrylate.

CONTAMINATED CONTAINERS/PACKAGES :

- The disposal of contaminated container shall be done after confirmed the remaining of chemical in container. The remaining chemical shall be disposed by the above method.
- Dispose the contaminated container after cleaned with water. Contaminated water shall be treated at waste water treatment such as Activated Sludge System. Do not discharge to natural waters.
- Wear appropriate protective equipments.

(refer to ITEM 8 EXPOSURE CONTROLS / PERSONAL PROTECTION)

- Entrust the dispose to authorized waste management firms in accordance with local / regional / national / international regulations.

14. TRANSPORT INFORMATION

UN NUMBER : 1247

UN PROPER SHIPPING NAME : Methyl Methacrylate, Monomer, Stabilized

TRANSPORT HAZARD CLASS : 3 (Flammable Liquid)

PACKING GROUP : II

MARINE POLLUTION CATEGORY : Category Y (MARPOL Annex II)

TRANSPORT WITH LARGE CONTAINER : Data not applicable.

SPECIAL PRECAUTION :

Methyl Methacrylate is flammable liquid and hazardous. Transportation and liquid loading must be done under the statutes determined in Hazardous Substance Act, Transport Act, etc.

15. REGULATORY INFORMATION

COMPLY WITH EACH COUNTRY'S REGULATIONS:

THAILAND REGULATION :

Thai Hazardous Substance Act B.E.2535 (1992) : Classified MMA as type 2 hazardous substance.

Type 2 hazardous substance is that of which the production, import, export, or having in possession must first be notified to the authority and must also comply with the specified criteria and procedures.

CLASSIFICATION ACCORDING TO REGULATION (EC) :

HAZARD PICTOGRAMS :



RISK PHRASES : R11 - highly flammable.

R36/37 - Irritating to eyes and respiratory system.

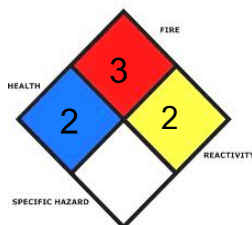
R43 - May cause sensitization by skin contact.

SAFETY PHRASES : S2 - Keep out of the reach of children.

S24 - Avoid contact with skin.

S37 - Wear suitable gloves.

NFPA CLASSIFICATION : Health 2, Fire 3, Reactivity 2



NFPA 704

16. OTHER INFORMATION

REFERENCE MATERIALS

- 1) Chemical Products 15710 (The Chemical Daily, Issue 2010)
 - 2) Disaster Prevention Guideline for Chemistry and Chemical Industry Issue I (The Chemical Society of Japan, Maruzen)
 - 3) Handbook of Hazardous/Toxic Substance (Japan Industrial Safety & Health Association)
 - 4) Handbook of Industrial Toxicology (Enlarged Edition) (Ishiyaku Publisers, Inc.)
 - 5) Japan Existing Chemical Handbook
 - 6) Ministry of Environment, Chemical Substance Risk Assessment
 - 7) Registry of toxic effects of chemical substances ('92)
 - 8) Oil and Hazardous Materials / Technical Assistance Data System ('92)
 - 9) Handbook of Environmental Data on Organic Chemicals : K. Verschuren
 - 10) Existing Chemical Safety (Hazard) Assessment Sheet 96-35
 - 11) IPCS (Environmental health Criteria 154)
 - 12) U.S. Environmental Protection Agency, BCFWINTM V2.15
 - 13) ezCRIC2006 (Japan Chemical Data Base)
 - 14) The Promotion of international Regulation and Measure for Chemical Substances (The research about GHS Classification of Specified Substance controlled by Law and candidate substance)
 - 15) GHS Classification Guidance for Enterprises" Ministry of Economy, Trade, and Industry (March 2009)
 - 16) Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices (ACGIH , Ver.2011)
 - 17) 3M 2012 Respirator Selection Guide
 - 18) U.S. Department of Health and Human Services(1988)
 - 19) MMA Safety Data Sheet , AsahiKASEI (2011)
 - 20) Notification of Ministry of Industry Subject Hazard Classification and Communication of Hazardous Substance (2012)
 - 21) NIOSH Pocket Guide to Chemical Hazard
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SAFETY DATA SHEET

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THE USE OF INFORMATION IN SDS :

This safety data sheet (SDS) has been created based on the latest available materials and data, and has been revised to reflect new information. The warning and cautions in this SDS assume normal usage. Special or unique usage of this product should be conducted according to appropriate safety measures. This SDS contains adequate warnings by our company, but we do not purport to guarantee all contents.
