

Product Stewardship Summary

Methyl acrylate

General Statement

Methyl acrylate is an acrylic ester that is used in formulation of homopolymers and copolymers. Methyl acrylate also serves as a feedstock for chemical syntheses of organic and inorganic compounds. Methyl acrylate is a moderate to severe hazard material and risk of adverse health effects associated with both occupational and consumer use of this chemical is anticipated to be low.

Chemical Identity

Name: Methyl acrylate

Brand Names: Not applicable

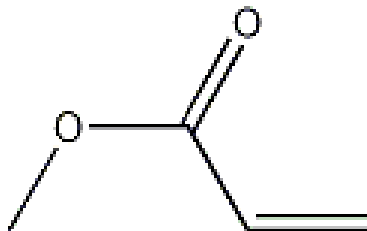
Chemical name (IUPAC): methyl prop-2-enoate

CAS number(s): 96-33-3

EC number: 202-500-6

Molecular formula: C₄H₆O₂

Structure:



Uses and Applications

Methyl acrylate is used in the production of coatings, elastomers, adhesives, thickeners, surfactants, fibers, plastics, textiles and inks.



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Physical/Chemical Properties

Phys/Chem Safety Assessment

Property	Value
Form	Volatile
Physical state	Liquid
Color	Colorless
Odor	Acrid
Density	0.951 g/cm ³ @ 20°C
Melting / boiling point	-76.5 / 80.5 °C
Flammability	No data available
Explosive properties	No data available
Self-ignition temperature	468°C
Vapor pressure	90 hPa @ 20.2°C
Mol weight	80.69 g/mol
Water solubility	60 g/L @ 20°C
Flash point	-2.8°C
Octanol-water partition coefficient (LogK _{ow})	0.739 @ 25°C

Exposure, Hazard and Safety Assessment

The following section describes possible exposure scenarios and hazards associated with methyl acrylate. The exposure assessment describes both the amount of and the frequency with which a chemical substance reaches a person, a population of people, or the environment. Hazard refers to the inherent properties of a substance that make it capable of causing harm to human health or the environment. The safety assessment reports the possibility of a harmful event arising from exposure to a chemical or physical agent under specific conditions. Just because a substance may possess potentially harmful properties does not mean that it automatically poses a risk. It is not possible to make that determination without understanding the exposure.

Human Health Effects

Human Exposure Assessment

Consumer: Methyl acrylate is used as a monomer in polymerization reactions. Methyl acrylate is not sold directly for consumer usage. Therefore, consumer exposure is most likely limited to extremely low levels of residual monomer present within the polymers used in consumer products.

Worker: In industrial settings, methyl acrylate is manufactured and handled in closed processes as much as possible, which ensures that worker exposure is minimized. When there is potential for exposure, during loading, unloading, sampling or during maintenance operations, exposure to methyl acrylate can be further minimized by the proper use of personal protective equipment.

Human Hazard Assessment:

Methyl acrylate is moderately toxic following single exposures but does not cause significant toxicity to internal organs after repeated exposure in animal studies by oral or inhalation routes of exposure. It is severely irritating to the skin, eyes, and respiratory tract and can cause skin sensitization. It is not associated with reproductive/developmental toxicity at doses below those causing maternal toxicity. Methyl acrylate is not classified as a carcinogen and based on available data is not likely to cause mutagenic or genotoxic effects.

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Moderately toxic following oral, dermal, and inhalation exposures. Swallowing may result in burns of the mouth and throat. Highly toxic following inhalation exposures, vapor concentrations could cause serious adverse effects to the lungs which may result in death.
Irritation / corrosion Skin / eye / respiratory test	Contact causes severe skin and eye irritation. May cause sensitization following direct contact with the skin Excessive exposure to vapor may cause irritation to upper respiratory tract (nose and throat) and lungs
Toxicity after repeated exposure Oral / inhalation / dermal	Does not cause significant toxicity to internal organs after repeated exposure in animal studies by oral or inhalation routes of exposure. The predominant effect is local irritation.
Genotoxicity / Mutagenicity	Based on the available test data, not expected to cause genetic effects.
Carcinogenicity	No carcinogenic effects expected.
Toxicity for reproduction	No adverse effects on fertility and development are reported at doses that were not toxic to the mother.

Human Health Safety Assessment

Consumer: Methyl acrylate is used as a chemical intermediate and monomer in polymerization reactions and will be used almost exclusively in the form of a polymer within consumer products. Therefore, due to the extremely low levels of residual monomer present in consumer products, exposure and subsequent risk is unlikely.

Worker: In industrial settings, methyl acrylate is manufactured and handled primarily in closed processes which limit exposure. Based on good manufacturing processes and industrial hygiene, the occupational health risk associated with methyl acrylate is low.

Environmental Effects

Environmental Exposures

Methyl acrylate is readily biodegradable and has low potential for bioaccumulation. If released into water, methyl acrylate is not expected to adsorb to suspended solids and sediment. If released to soil, methyl acrylate is expected to have high mobility. Volatilization from dry soil surfaces is expected to be an important fate process.

Environmental Hazard Assessment

Effect Assessment	Result
Aquatic Toxicity	Highly toxic to aquatic organisms.

Fate and behavior	Result
Biodegradation	Readily biodegradable.
Bioaccumulation potential	Not potentially bioaccumulative (log Kow = 0.739).
PBT / vPvB conclusion	Not considered to be either PBT or vPvB.

Environmental Safety Assessment

Methyl acrylate is acutely toxic to aquatic organisms. In spite of relatively high aquatic toxicity, methyl acrylate does not bioaccumulate and will be quickly removed from the aquatic environment through degradation and evaporation. It is therefore anticipated to present a low overall risk to aquatic environments.

Risk Management Recommendations

Methyl acrylate is used as a chemical intermediate and monomer in polymerization reactions. Consumer products will not contain appreciable levels of methyl acrylate and, therefore, exposure and health risks to consumers are considered negligible. In the occupational setting, responsible handling of methyl acrylate will prevent the potential for skin sensitization or skin, eye, and respiratory irritation and allow workers to use materials containing methyl acrylate safely.

A selection of occupational exposure limits are below.

- OSHA: 8-hr TWA 10 ppm – skin designation
- NIOSH: 10-hr TWA 10 ppm – Potential for dermal absorption
- ACGIH: 8-hr TWA 2 ppm – skin designation

Regulatory Agency Review

Methyl acrylate is on the following lists:

ACGIH - Threshold Limit Values (TLVs)
Alberta - Occupational Exposure Limits (OELs)
Argentina - Occupational Exposure Limits (OELs)
Arizona DOSH - Exposure Limits for Air Contaminants - Table Z-1
Australia - Workplace Exposure Standards
Australian Inventory of Chemical Substances (AICS)
Austria - Occupational Exposure Limits (OELs)
Belgium - Occupational Exposure Limits (OELs)
British Columbia - Occupational Exposure Limits (OELs)
Bulgaria - Occupational Exposure Limits (OELs)
Cal/OSHA - Permissible Exposure Limits for Chemical Contaminants
Cal/OSHA - The Hazardous Substances List
China - Chemical Inventory of Existing Chemical Substances (IECSC) - CAS Numbers
Colombia - Occupational Exposure Limits (OELs)
Connecticut OSHA - Exposure Limits for Air Contaminants - Table Z-
Denmark - Occupational Exposure Limits (OELs)
DOE Protective Action Criteria (PAC)
ECHA - List of Pre-registered Substances
Environment Canada - Domestic Substances List (DSL)
Environment Canada - Domestic Substances List (DSL) Categorization of Existing Substance
Environment Canada - Hazardous Products Act (HPA) - Ingredient Disclosure List (IDL)
Environment Canada - National Pollutant Release Inventory (NPRI) - 2001

Environment Canada - National Pollutant Release Inventory (NPRI) - 2002
Environment Canada - National Pollutant Release Inventory (NPRI) - 2003
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Environment Canada - National Pollutant Release Inventory (NPRI) - 2010
Environment Canada - National Pollutant Release Inventory (NPRI) - 2011
Environment Canada - National Pollutant Release Inventory (NPRI) - 2012/2013
Environment Canada - National Pollutant Release Inventory (NPRI) - 2014-2015
Environment Canada - National Pollutant Release Inventory (NPRI) - 2016-2017
EPA - 40CFR - Table 1 to Subpart F of Part 63—Synthetic Organic Chemical Manufacturing Industry Chemicals
EPA - Chemical Update System (CUS) - 2002
EPA - EPCRA - Section 313 - Toxic Chemicals
EPA - High Production Volume (HPV) - Chemical Hazard Data Availability
EPA - IRIS - Inhalation Reference Concentrations (RfCs)
EPA - IRIS - Inhalation Unit Risks
EPA - IRIS - Oral Reference Doses (RfDs)
EPA - IRIS - Oral Slope Factors
EPA - IRIS - Substance List
EPA - IRIS - Weight of Evidence (WOE) Characterizations
EPA - Office of Pollution Prevention and Toxics (OPPT) High Production Volume (HPV) Program - 1990
EPA - Regional Removal Management Levels (RML) - Chemical-specific Parameters Supporting - Density
EPA - Regional Removal Management Levels (RML) - Chemical - specific Parameters Supporting - Diffusivity
EPA - Regional Removal Management Levels (RML) - Chemical - specific Parameters Supporting - Henry's Law Constants
EPA - Regional Removal Management Levels (RML) - Chemical - specific Parameters Supporting - Molecular Weight
EPA - Regional Removal Management Levels (RML) - Chemical - specific Parameters Supporting - Organic Carbon Partition Coefficient
EPA - Regional Removal Management Levels (RML) - Chemical - specific Parameters Supporting - Permeability Coefficient
EPA - Regional Removal Management Levels (RML) - Chemical - specific Parameters Supporting - Water Solubility
EPA - Regional Removal Management Levels (RML) - Industrial Soil Supporting (TR=1E-4, HQ=1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Removal Management Levels (RML) - Industrial Soil Supporting (TR=1E-4, HQ=3) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Removal Management Levels (RML) - Residential Soil Supporting - Toxicity and Chemical-specific Information
EPA - Regional Removal Management Levels (RML) - Residential Soil Supporting (TR=1E-4, HQ=1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Removal Management Levels (RML) - Residential Soil Supporting (TR=1E-4, HQ=3) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Removal Management Levels (RML) - Residential Tapwater Supporting - Toxicity and Chemical-specific Information
EPA - Regional Removal Management Levels (RML) - Residential Tapwater Supporting (TR=1E-4, HQ=1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Removal Management Levels (RML) - Residential Tapwater Supporting (TR=1E-4, HQ=3) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Removal Management Levels (RML) - Summary Table - Toxicity and Chemical-specific Information
EPA - Regional Removal Management Levels (RML) - Summary Table (TR=1E-4, HQ=1) - Screening Levels
EPA - Regional Removal Management Levels (RML) - Summary Table (TR=1E-4, HQ=3) - Screening Levels
EPA - Regional Screening Levels (RSL) - Chemical-specific Parameters Supporting - Density
EPA - Regional Screening Levels (RSL) - Chemical-specific Parameters Supporting - Diffusivity in Air and Water
EPA - Regional Screening Levels (RSL) - Chemical-specific Parameters Supporting - Melting Point
EPA - Regional Screening Levels (RSL) - Chemical-specific Parameters Supporting - Molecular Weight
EPA - Regional Screening Levels (RSL) - Chemical-specific Parameters Supporting - Partition Coefficients
EPA - Regional Screening Levels (RSL) - Chemical-specific Parameters Supporting - Tapwater Dermal Parameters
EPA - Regional Screening Levels (RSL) - Chemical-specific Parameters Supporting - Volatility Parameters

EPA - Regional Screening Levels (RSL) - Chemical-specific Parameters Supporting - Water Solubility
EPA - Regional Screening Levels (RSL) - Composite Worker Ambient Air - Toxicity and Chemical-specific Information
EPA - Regional Screening Levels (RSL) - Composite Worker Ambient Air (TR=1E-06, HQ=0.1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Composite Worker Ambient Air (TR=1E-06, HQ=1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Composite Worker Soil - Toxicity and Chemical-specific Information
EPA - Regional Screening Levels (RSL) - Composite Worker Soil (TR=1E-06, HQ=0.1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Composite Worker Soil (TR=1E-06, HQ=1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Resident Ambient Air - Toxicity and Chemical-specific Information
EPA - Regional Screening Levels (RSL) - Resident Ambient Air (TR=1E-06, HQ=0.1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Resident Ambient Air (TR=1E-06, HQ=1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Resident Fish Table (TR=1E-6, HQ=0.1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Resident Fish Table (TR=1E-6, HQ=1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Resident Fish Table - Toxicity and Chemical-specific Information
EPA - Regional Screening Levels (RSL) - Resident Soil - Toxicity and Chemical-specific Information
EPA - Regional Screening Levels (RSL) - Resident Soil (TR=1E-06, HQ=0.1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Resident Soil (TR=1E-06, HQ=1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Resident Soil to Groundwater - Toxicity and Chemical-specific Information
EPA - Regional Screening Levels (RSL) - Resident Soil to Groundwater (TR=1E-06, HQ=0.1) - Protection of Groundwater SSLs
EPA - Regional Screening Levels (RSL) - Resident Soil to Groundwater (TR=1E-06, HQ=1) - Protection of Groundwater SSLs
EPA - Regional Screening Levels (RSL) - Resident Tapwater - Toxicity and Chemical-specific Information
EPA - Regional Screening Levels (RSL) - Resident Tapwater (TR=1E-06, HQ=0.1) - Carcinogenic and Noncarcinogenic SLs
EPA - Regional Screening Levels (RSL) - Resident Tapwater (TR=1E-06, HQ=1) - Carcinogenic and Noncarcinogenic SL
EPA - Regional Screening Levels (RSL) - Summary Table - Toxicity and Chemical-specific Information
EPA - Regional Screening Levels (RSL) - Summary Table (TR=1E-06, HQ=0.1) - Screening Levels
EPA - Regional Screening Levels (RSL) - Summary Table (TR=1E-06, HQ=1) - Screening Levels
EPA - Regional Screening Levels (RSL) - Summary Table (TR=1E-6, HQ=0.1) - Protection of Groundwater SSLs
EPA - Regional Screening Levels (RSL) - Summary Table (TR=1E-6, HQ=1) - Protection of Groundwater SSLs
EPA - Toxics Release Inventory (TRI) Chemicals
EPA - TSCA - 8(a) - Preliminary Assessment Information Rules (PAIR)
EPA - TSCA - Inventory
EPA - TSCA - Test Submissions - Section 4
ETUC - Priority List for REACH Authorisation
EU - European Inventory of Existing Commercial Substances (EINECS)
EU - Indicative Occupational Exposure Limits (Consolidated List)
EU - Table 3.1 of Annex VI to the CLP Regulation
EU - Table 3.2 of Annex VI to the CLP Regulation
FDA - Everything Added to Food In The United States (EAFUS)
FDA - Select Committee on GRAS Substances
Finland - Occupational Exposure Limits (OELs)
France - Occupational Exposure Limits (OELs)
Germany - Occupational Exposure Limits (OELs)
Hawaii - Department of Labor and Industrial Relations - Air Contaminants - Permissible Exposure Limits
Hungary - Occupational Exposure Limits (OELs)
IARC- Group 3
Iceland - Occupational Exposure Limits (OELs)
Indiana OSHA - Exposure Limits for Air Contaminants - Table Z-1
International Council of Chemical Associations (ICCA) - High Production Volume (HPV) Initiative
International Council of Chemical Associations (ICCA) - High Production Volume (HPV) Initiative Completed Summaries
Iowa OSHA - Exposure Limits for Air Contaminants - Table Z-1
Japan - Occupational Exposure Limits (OELs)
Jordan - Occupational Exposure Limits (OELs)

Korea - Occupational Exposure Limits (OELs)
Maryland OSH - Exposure Limits for Air Contaminants - Table Z-1
Massachusetts Department of Public Health - Massachusetts Substance List (MSL)
Mexico - National Inventory of Chemical Substances
Mexico - Occupational Exposure Limits (OELs)
Michigan - Exposure Limits for Air Contaminants - Table G-1-A
Mine Safety and Health Administration (MSHA) - Permissible Exposure Limits (PELs)
Minnesota - Department of Labor and Industry - Air Contaminants - Permissible Exposure Limits
Minnesota - List of Hazardous Substances
Minnesota Department of Health - Toxic Free Kids Act - Chemicals of High Concern
National Cancer Institute - SMILES Notations
Nevada OSHA - Exposure Limits for Air Contaminants - Table Z-1
New Jersey - Right to Know List
New Mexico OHSB - Exposure Limits for Air Contaminants - Table Z-1
New Zealand - Inventory of Chemicals (NZIoC)
New Zealand - Workplace Exposure Standards
NFPA - Hazard Ratings
NIOSH - Immediately Dangerous to Life or Health (IDLH) Concentration Values
NIOSH - Pocket Guide - Chemicals Listed
NIOSH - Recommendations for Chemical Protective Clothing
NIOSH - Recommended Exposure Limits (RELs)
Norway - Occupational Exposure Limits (OELs)
OECD - High Production Volume (HPV) Chemicals - 2004
OECD - High Production Volume (HPV) Chemicals - 2007
Ontario - Current Occupational Exposure Limits (OELs)
OSHA - 29 CFR 1910.1000 - Table Z-1
OSHA - 29 CFR 1910.1000 - Table Z-1 - Annotated
OSHA - Permissible Exposure Limits (PELs) - Construction
OSHA - Permissible Exposure Limits (PELs) - Federal Contractors
OSHA - Permissible Exposure Limits (PELs) - Shipyards
Pennsylvania - Hazardous Substance List
People's Republic of China - Second Category of Chemicals Subject to the Environmental Management on the First Import of Chemicals
Peru - Occupational Exposure Limits (OELs)
Philippine Inventory of Chemicals and Chemical Substances (PICCS)
Poland - Occupational Exposure Limits (OELs)
Puerto Rico OSHA - Exposure Limits for Air Contaminants - Table Z-1
Regional Screening Level (RSL) Composite Worker Ambient Air (TR=1E-6, HQ=1) - Toxicity and Chemical-specific Information
Rhode Island - Hazardous Substance List
Russia - Occupational Exposure Limits (OELs)
Singapore - Occupational Exposure Limits (OELs)
South Carolina OSH - Exposure Limits for Air Contaminants - Table Z-1
Sweden - Occupational Exposure Limits (OELs)
Switzerland - Occupational Exposure Limits (OELs)
Technischen Regeln für Gefahrstoffe (TRGS) - TRGS900
Tennessee OSHA - Exposure Limits for Air Contaminants - Table Z-1
The Netherlands - Occupational Exposure Limits (OELs)
The Philippines - Occupational Exposure Limits (OELs)
Turkey - Occupational Exposure Limits (OELs)
United Kingdom - Workplace Exposure Limits (WELs) - 2011
USGS - Health-Based Screening Levels (HBSLs)
Utah OSH - Exposure Limits for Air Contaminants - Table Z-1
Vermont - Department of Labor - Air Contaminants - Permissible Exposure Limits
Vietnam - Occupational Exposure Limits (OELs)
Virgin Islands DOSH - Exposure Limits for Air Contaminants - Table Z-1
Virginia OSH - Exposure Limits for Air Contaminants - Table Z-1
Washington State - Permissible Exposure Limits (PELs) for Airborne Contaminants
Wyoming OSHA - Exposure Limits for Air Contaminants - Table Z-1

Regulatory Information / Classification and Labeling

Under the Globally Harmonized System for classification and labeling (GHS), substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the (Extended) SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use.

GHS Classification:

Eye Irritation, Category 2
Skin Irritation, Category 2
Skin Sensitization, Category 1
Acute toxicity (oral), Category 4
Acute toxicity (dermal), Category 4
Acute toxicity (inhalation), Category 4
STOT SE, Category 3
Flammable Liquids, Category 2

Hazard Statements:

H225: Highly flammable liquid and vapor
H302: Harmful if swallowed
H312: H312: Harmful in contact with skin
H315: Causes skin irritation
H317: May cause allergic skin reaction
H319: Causes serious eye irritation
H332: Harmful if inhaled
H335: May cause respiratory irritation

Signal Word: Danger

Precautionary Statements:

P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233: Keep container tightly closed.
P240: Ground/bond container and receiving equipment.
P242: Use only non-sparking tools.
P243: Take precautionary measures against static discharge
P261: Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264: Wash skin thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P272: Contaminated work clothing must not be allowed out of the workplace.
P280: Wear eye protection/ face protection/ protective gloves.
P271: Use only outdoors or in a well-ventilated area.
P303: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician.
P305: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P370: In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235: Store in a well-ventilated place. Keep cool.
P333: If skin irritation or rash occurs: Get medical advice/ attention.
P337: If eye irritation persists: Get medical advice/ attention.
P362: Take off contaminated clothing and wash before reuse.
P403 + P233 + P235: Store in a well-ventilated place. Keep container tightly closed. Keep cool.
P405: Store locked up.
P501: Dispose of contents/ container to an approved waste disposal plant.

Hazard Pictograms:



Conclusion

Methyl acrylate is used as a chemical intermediate and monomer in polymerization reactions. Consumer products will not contain appreciable levels of methyl acrylate and, therefore, exposure and health risks to consumers are considered negligible. In the occupational setting, responsible handling of methyl acrylate will prevent the potential for skin sensitization or skin, eye, and respiratory irritation allowing workers to use materials containing methyl acrylate safely.

Contact Information with Company

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Additional Information

For more information on GHS, visit <http://www.osha.gov/dsg/hazcom/ghsguideoct05.pdf> or http://live.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html.

Ashland product stewardship summaries are located at <http://www.ashland.com/sustainability/product/product-stewardship>

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REACH registration is specific to Importers/Manufacturers that place the chemical on the EU market, and is specific to registered uses. Inclusion on the list of REACH Registered Substances does not automatically imply registration by Ashland.

Inclusion on the New Zealand Inventory of Chemicals applies only to the pure substance listed. The importer of record must determine whether or not their substances are in compliance.