

GPS Safety Summary

n-Butyl methacrylate (n-BMA), Isobutyl methacrylate (i-BMA)

The Product Safety Summary is intended to provide a general overview of the chemical substance in the context of ICCA Global Product Strategy. The information on the summary is basic information and is not intended to provide emergency response, medical or treatment information.

Substance name

n-Butyl Methacrylate (n-BMA), CAS-No. 97-88-1


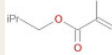
Isobutyl Methacrylate (i-BMA), CAS-No. 97-86-9

General statement

n-Butyl- and Isobutyl Methacrylate are produced for the use as a building block to make a wide range of polymer based products that we see and use every day from paints and coatings, toners and inks, oil additives to dental and medical products to name but a few. Because of the similarity of the two isomers in structure and properties a single summary has been provided for both chemicals.

n-BMA- and i-BMA are of low concern to human health and the environment. Both are classified as hazardous (flammable, skin irritant, sensitizing and toxic/harmful to aquatic life) but have been handled safely by industry and professionals for over 60 years. n-BMA- and i-BMA-based polymers are inert in the environment and can be recycled back to the monomer.

Chemical identity

Name	n-Butyl methacrylate	Isobutyl methacrylate
Brand names	VISIOMER® n-BMA	VISIOMER® i-BMA
Chemical name (IUPAC)	Butyl methacrylate	Isobutyl methacrylate
CAS number	97-88-1	97-86-9
Molecular formula:	C ₈ H ₁₄ O ₂	C ₈ H ₁₄ O ₂
Structure		
Synonyms	2-Propenoic acid, 2-methyl-, butyl ester	2-Propenoic acid, 2-methyl-, 2-methylpropyl ester

Uses and application

n-BMA- and i-BMA are produced for the use as monomer for production of polymers. Both are manufactured in industrial settings in closed systems and used by industry for manufacture of polymers in closed and semi-closed systems. Downstream use of n-BMA- and i-BMA is almost exclusively in the form of polymer, although some products used by professionals and hobbyists may contain significant quantities of the liquid monomer.

Physical/chemical properties

Property	Value n-BMA	Value i-BMA
Physical state	liquid	liquid
Color	colorless	colorless
Odor	ester-like	ester-like
Melting point	-50 °C	-35 °C
Boiling point	163 °C	155 °C
Density	0.89 g/ml (20 °C)	0.88 g/ml (25 °C)
Molecular weight	142.2 g/mol	142.2 g/mol
Water solubility	360 mg/l (25 °C)	470 mg/l (20 °C)
Vapor pressure	2.12 hPa (20 °C)	2.11 hPa (20 °C)
Flash point	48.5 °C (closed cup)	42.5 °C (closed cup)
Octanol-water partition coefficient	log Pow: 3.0	log Pow: 2.95
Viscosity	1.06 mm ² /s (20 °C)	1.01 mm ² /s (20 °C)
Flammability	flammable	flammable

Health effects

Effect Assessment	Result
Acute toxicity (oral, dermal and inhalation)	Low toxicity after oral, dermal and inhalation exposure.
Irritation	Causes irritation to the skin and respiratory system. Slightly irritating to the eyes.
Sensitization	Sensitizing by skin contact possible. No evidence of respiratory sensitization.
Mutagenicity	Not mutagenic. No evidence of carcinogenicity.
Toxicity after repeated exposure	By prolonged inhalation n-BMA or i-BMA may cause damage to the part of the nose responsible for detection of smell. Other effects in the body are non-specific.
Toxicity for reproduction	Does not selectively harm reproduction or cause birth defects.

Environmental effects

Effect Assessment	Result
Aquatic toxicity (acute/ short-term)	Low to moderate toxicity to aquatic organisms.
Fate and Behavior	Result
Biodegradation	Readily biodegradable
Bioaccumulation potential	Not bioaccumulative
PBT / vPvB conclusion	Considered neither to be Persistent, Bioaccumulative and Toxic (PBT) nor very Persistent and very Bioaccumulative (vPvB).

Exposure

Human health

n-BMA- and i-BMA are produced in essentially closed systems so significant worker exposure during manufacture is unlikely. Workers will come into contact with n-BMA or i-BMA during polymer production and professional use of products containing liquid monomer.

Consumer exposure to liquid monomer is unlikely unless they use one of the few professional/DIY or hobbyist products that contain significant levels of liquid monomer. Consumer exposure is therefore most likely only to the low levels of residual monomer in polymers used in consumer products (n-BMA- and i-BMA are used as monomers in polymerization). Use of n-BMA or i-BMA in artificial nail products and other non-medical/dental applications involving direct skin/nail contact with the liquid monomer is not recommended.

Environment

Direct use by consumers is not intended since there are no known consumer uses for this chemical. The manufacture is a closed and automated process and no exposure to the environment are intended. Any exposures will generally be lower than concern levels. Any waste containing residual n-BMA or i-BMA has to be disposed in accordance with local, state and federal laws.

Risk management recommendations

Industry use, production and formulation

Workers will come into contact with n-BMA or i-BMA during polymer production and professional use of products containing liquid monomer. Workers should follow the recommended safety measures as provided by the manufacturer in the Safety Data Sheet. Considering the skin irritating and sensitizing properties this typically will include avoiding skin contact or the wearing of suitable protective gloves and avoiding inhalation of high concentrations of vapor by use of one or more of the following: engineering controls, good general ventilation or personal protective (respiratory)

equipment, depending upon the particular use conditions. Releases to air and water during manufacturing processes and use would rapidly disappear by degradation processes in the environment.

Consumer use

Consumer use of products containing n- or i-BMA-based polymers does not require any risk management measures relating to the BMA residues in those polymers. Use of professional/DIY and hobbyist products that contain liquid n-BMA or i-BMA monomer will require the user to follow the guidance provided by the product manufacturer on the packaging or product label. This will depend upon the product composition, but may include recommendations to avoid skin contact (to prevent skin irritating / sensitizing properties) and to provide good general ventilation (to prevent irritation of the respiratory system by high concentrations of the vapors) when handling the uncured (unpolymerized) product. Uncured (unpolymerized) product should not be poured down the drains or disposed of in domestic waste. Use of n-BMA or i-BMA in artificial nail products and other non-medical/dental applications involving direct skin/nail contact with the liquid monomer is not recommended.

State agency review

- UN-GHS Ver. 4 (2011)

Regulatory information/classification and labelling

GHS-Classification

Statutory basis UN-GHS Ver. 4 (2011)	n-Butyl- and Isobutyl methacrylate
Flammable liquid	Hazard category 3*
STOT single exposure (inhalation)	Hazard category 3
Skin corrosion/irritation	Hazard category 2
Skin Sensitization	Hazard category 1B*
Hazardous to the aquatic environment – Acute Hazard n-BMA	Hazard category 2 (n-BMA)
Hazardous to the aquatic environment – Acute Hazard i-BMA	Hazard category 3* (i-BMA)

* No worldwide use of this category. Not used in the European Union.

GHS-Labeling

Statutory basis UN-GHS Ver. 4 (2011)	n-Butyl- and Isobutyl methacrylate
Symbol(s)	
Signal word	Danger
Hazard statements	<p>H226 – Flammable liquid and vapour.</p> <p>H315 – Causes skin irritation.</p> <p>H317 – May cause an allergic skin reaction.</p> <p>H335 – May cause respiratory irritation.</p> <p>n-BMA: H401 – Toxic to aquatic life.</p> <p>i-BMA: H402 – Harmful to aquatic life.</p>
Precautionary statements	Precautionary statements and more information about n-BMA and i-BMA can be found on the Safety Data Sheet.
Prevention	<p>Keep away from flames and hot surfaces. – No smoking.</p> <p>Wear protective gloves and eye/face protection.</p> <p>Avoid breathing dust/fume/gas/mist/vapors/spray.</p> <p>Contaminated work clothing must not be allowed out of the workplace.</p>
Response	<p>In case of fire: Use foam, dry chemical, carbon dioxide to extinguish.</p> <p>If on skin: wash with plenty of soap and water.</p> <p>If skin irritation or rash occurs: Get medical advice/attention.</p> <p>Wash contaminated clothing before reuse.</p>
Storage	<p>Store in a well-ventilated place. Keep cool.</p> <p>Store locked up.</p>
Disposal	Dispose of contents/container in accordance with local regulation.

Glossary

Acute toxicity	harmful effects after a single exposure
Biodegradable	breakdown of materials by a physiological environment
Bioaccumulation	accumulation of substances in the environment
Carcinogenicity	effects causing cancer
Chronic toxicity	harmful effects after repeated exposures
GHS	Global Harmonized System on Classification and Labeling
Mutagenicity	effects that change genes
PBT	Persistent Bioaccumulative Toxic
Reprotoxicity	teratogenicity, embryotoxicity and harmful effects on fertility
Sensitizing	allergenic
Teratogenic	effects on foetal morphology
vPvB	very Persistent very Bioaccumulative

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For more product safety summaries, please visit:

[Methacrylates Producers Association](#)

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Performance of the chemical described herein should be verified by testing which should be carried out only by qualified experts.

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