BASIC ACRYLIC MONOMER MANUFACTURERS, INC.

GLOBAL PRODUCT SUMMARY: TERT-BUTYL ACRYLATE

(Last Updated: April 6, 2024)

Disclaimer

SUBSTANCE NAME

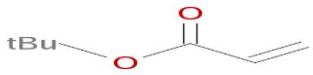
Tert-Butyl acrylate

GENERAL STATEMENT

Tert-butyl acrylate (tBA) is a colorless volatile liquid with an acrid odor. It is used in the production of coatings, adhesives, fibers, plastics, textiles and inks.

CHEMICAL IDENTITY

Name: Tert-butyl acrylate
Chemical name (IUPAC): tert-butyl acrylate
Synonym: 2-Propenoic acid, 1,1-dimethylethyl ester
CAS number(s): 1663-39-4
Molecular formula: C7H12O2



Structure:

USES AND APPLICATIONS

Acrylate esters, the family of chemicals to which tBA belongs, are used primarily as reactive building blocks to produce coatings and inks, adhesives, sealants, textiles, and plastics. Specifically, tBA is used in the following applications:

- **Adhesives:** for use in construction and pressure-sensitive adhesives as a co-monomer
- **Coatings:** monomers used to produce polymers for architectural, decorative, industrial, paper and roof coatings
- **Leather:** to produce different polymer finishes, particularly nubuck and suede
- **Plastics:** for the manufacture of a variety of plastics
- **Fibers:** in the manufacture of fibers of both woven and non-woven textiles as a copolymer. The fibers are in turn used for e.g. the manufacture of textiles.

Tert-butyl acrylate (tBA) is not sold for direct consumer use and the manufacturers do not support the use in consumer products. t-BA is used as a raw material to make a variety of goods used by consumers or construction personnel, including those listed above. tBA can be present in trace amounts as residual monomer in consumer/finished products, including paints.

PHYSICAL/CHEMICAL PROPERTIES

The following table includes information which refers to testing performed with the concentrated substance. It is not intended to be comprehensive or to replace information found in the Safety Date Sheet (SDS). A Safety Data Sheet may be obtained from one of the manufacturers.

Property	Value
Physical state	Liquid (at room temperature)
Color	Colorless
Odor	fruit-like
Density	0.87 g/cm³ @ 20°C
Melting / boiling point	-69°C / 119.2 °C @ atmospheric pressure
Flammability	Highly flammable upon ignition. The substance has no pyrophoric properties and does not liberate flammable gases on contact with water.
Explosive properties	Non explosive
Self-ignition temperature	400 °C
Vapor pressure	20 hPa @ 23.4 °C
Molecular weight	128.169
Water solubility	approx. 2 g/L @ 20°C
Flash point	14 °C (cc)
Octanol-water partition coefficient (Log Pow)	2.32@ 25°C

HUMAN HEALTH SAFETY ASSESSMENT

Information for the general population and consumers handling products made with tert-butyl acrylate.

Acrylate esters, including tBA, have a very strong, unpleasant odor that may be bothersome. However, the smell of acrylates does not necessarily indicate a health hazard.

Like any reactive chemical tBA can create hazards if not handled properly. tBA is of pronounced toxicity if inhaled and of moderate toxicity if swallowed and after short-term skin contact. tBA causes irritation to skin and the respiratory tract. Repeated skin contact may cause allergic skin reactions. Animal studies have not indicated that tBA causes cancer, specific target organ toxicity except for local effects or reproductive toxicity.

The following table includes information for someone handling the concentrated substance. The data, while verifiable, are not intended to be comprehensive nor replace the information found in the SDS.

Effect Assessment	**Result**
Acute Toxicity Oral / inhalation / dermal	Harmful after contact with skin or if swallowed. Toxic after short-term inhalation.
Irritation / corrosion Skin / eye/ respiratory tract	Contact may cause skin irritation. May cause irritation to upper respiratory tract (nose and throat).
Sensitization	May cause an allergic skin reaction.
Toxicity after repeated exposure Oral / inhalation / dermal	After repeated exposure the predominant effect is local irritation. The degree of irritation depends on the concentration of the product and the duration of exposure.
Genotoxicity / Mutagenicity	Based on the available test data, not expected to cause genetic effects.
Carcinogenicity	Did not cause cancer in long term animal studies. Data from studies of the structural similar substance.
Toxicity for reproduction	Structurally similar substances did not cause adverse effects in the fetus at doses that were not toxic to the mother. No indications of a reproductive effect were seen in an OECD screening test. Structurally similar substances did not cause reproductive effects in laboratory animals. In addition, no effects were seen on reproductive organs in long-term animal studies.

ENVIRONMENTAL SAFETY ASSESSMENT

In contact with water, tBA will hydrolyze very slowly, also photodegradation in air will proceed slowly. tBA was not biodegradable in an OECD 310-Screening test. Based on an experimental log Pow and calculated BCF, there is no indication of bioaccumulation potential. Adsorption of tBA to the solid soil phase is not expected. tBA is toxic to aquatic organisms (fish, algae, invertebrates).

The following tables include information for testing performed with the concentrated substance. Additional information may be obtained from a manufacturer's SDS.

Effect Assessment	Result
Aquatic Toxicity	Toxic for aquatic organisms. Toxic to aquatic life with long lasting effects. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

Fate and behavior	Result
Biodegradation	Not readily biodegradable.
Bioaccumulation potential	Not expected to bioaccumulate.
PBT / vPvB* conclusion	Not considered to be either PBT nor vPvB

* Persistent/Bioaccumulative/Toxic (PBT) very Persistent-very Bioaccumulative (vPvB)

EXPOSURE

Human health

tBA is used in the production of industrial and consumer products.

- **Workplace exposure** – Exposure can occur either in a tBA manufacturing facility or in the various industrial or manufacturing facilities that use tBA. It is produced, distributed, stored and reacted in closed systems. Those working with tBA in manufacturing operations could be exposed during maintenance, sampling, testing, manual transfer, or other procedures. Workplace exposure is controlled by the use of proper industrial handling procedures and safety equipment.

- **Consumer exposure to products containing tert-butyl acrylate** – tBA is not sold for direct consumer use, but it is used as a raw material to make a variety of goods used by consumers or construction personnel and could be present in trace amounts as residual monomer in consumer products, including paints.

Environment

Potential releases into the environment are limited and for the most part occur only during production and processing, typically via wastewater and exhaust gases. If accidentally released to surface water, it rapidly biodegrades and will not persist in the environment and will not accumulate in the food chain.

RISK MANAGEMENT RECOMMENDATIONS

Industrial Manufacturing and Processing

In industrial manufacturing and processing applications, it is always important to obtain a current Safety Data Sheet (SDS) from your supplier, follow the guidance provided and comply with applicable regulations.

Acrylates and products containing them should always be handled in well ventilated areas. Each manufacturing facility should have a thorough training program for employees, appropriate work processes, and safety equipment in place to limit unnecessary exposure.

In the event of a spill, the focus is on containing the spill to prevent contamination of soil, ditches, sewers, or surface or ground water. Only trained and properly protected personnel should be involved in clean-up operations.

Professional Applications

Before using any chemical product, the user should be properly trained in safe handling procedures for that product. This means that they should always contact the supplier of the product being used to obtain the most current safe handling advice and follow all instructions and warnings.

Consumer Applications

It is important to read and follow all warnings and instructions on the product label or packaging.

REGULATORY INFORMATION

This substance is subject to a number of federal and international statutes and regulations. Selected U.S. regulatory information is available on the BAMM website. Other federal, state and local regulations may apply.

This substance has been registered under EU chemical control law known as REACH (Registration, Evaluation, Authorisation and Restriction of Chemical substances), and is listed on various chemical inventories. It has been reviewed under the OECD SIDS (Screening Information Data Set) program.

While the toxicological data are not specific to a particular region, the regulatory frameworks differ between countries and regions. The Global Harmonized System managed by the United Nations (UN-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.

Under the UN-GHS, substances are classified according to their physical, health, and environmental hazards.

Note: The hazard statements and symbols presented here refer to the hazard properties of the concentrated substance and are meant to provide a brief overview of the substance's labelling. It is not intended to be comprehensive or to replace information found in the SDS.

Signal word: Danger
Hazard pictogram:
GHS02: flame

GHS06: skull and crossbones

GHS09: environment

GHS Classifications	Hazard Statements
Flammable Liquid Category 2	H225: Highly flammable liquid and vapour.
Acute Oral Toxicity Category 4	H302: Harmful if swallowed.
Acute Dermal Toxicity Category 4	H312: Harmful in contact with skin.
	H315: Causes skin irritation.
Skin Sensitization Category 1B	H317: May cause an allergic skin reaction.
Acute Inhalation Toxicity Category 3	H331: Toxic if inhaled.
Specific target organ toxicity – single exposure (STOT-SE) Category 3 Respiratory Irritant	H335: May cause respiratory irritation.
Aquatic Acute Category 2	H401: Toxic to aquatic life.
Aquatic Chronic Category 2	H411: Toxic to aquatic life with long lasting effects.

ADDITIONAL INFORMATION

Information on registered substance (ECHA)
https://echa.europa.eu/en/information-on-chemicals/registered-substances

IFA GESTIS-database on hazardous substances

https://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

OECD SIDS
http://webnet.oecd.org/Hpv/UI/SIDS_Details.aspx?id=e6b0a9af-08ac-462b-8167-98f5ae47a614

CONTACT

For further information on this substance or product safety summaries in general, please contact BAMM. Click on a logo below to go to the company's website.

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Glossary

Acute toxicity - harmful effects after a single exposure
Bioaccumulation - accumulation of substance in an organism
Biodegradation- chemical breakdown of substances by a physiological environment
Carcinogenicity - effects causing cancer
Chronic toxicity - harmful effects after repeated exposures
Clastogen - a substance that causes breaks in chromosomes
Embryotoxicity - harmful effects on fetal health
EU - European Union
eSDS -Extended Safety Data Sheet
GHS -Global Harmonized System managed by the United Nations (UN-GHS)
Hazard - situation bearing a threat to health and environment
HPV-High Production Volume
ICCA-International Council of Chemical Associations
Mutagenicity - effects that change genes
OECD-Organisation for Economic co-operation and Development
Concentrated - Non-formulated undiluted substance
REACH-Registration, Evaluation, Authorisation and Restriction of Chemical substances
Reprotoxicity - combining teratogenicity, embryotoxicity and harmful effects on fertility
SIDS - Screening Inventory Data set
SDS-Safety Data Sheet
Sensitizing - causes allergies
Teratogenic - effects on fetal morphology
PBT / vPvB-Persistent, Bioaccumulative and Toxic/ Very Persistent and Very Bioaccumulative

Disclaimer

This document is not intended to be comprehensive. It is provided solely as background information and should not substitute for an up-to-date Safety Data Sheet or research should specific regulatory or other legal questions arise. It is not intended to be a statement of legal requirements when using or handling acrylates. Although the information is believed to be accurate as of the last update, new information may become available and regulations frequently change, and no warranty, expressed or implied, is made concerning the contents. In addition, many states and localities adopt their own regulations, which are not covered by this summary or on the BAMM website. In all events, the user should consult applicable laws and regulations, as well as their supplier's Safety Data Sheet, for current information and requirements. **NO WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE, WARRANTY OF MERCHANTABILITY, OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE CONCERNING THE INFORMATION PROVIDED HEREIN.**