

# **Product Safety Assessment Butyl Acrylate**

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#### **Names**

- CAS No. 141-32-2
- n-Butyl propenoate
- Butvl ester acrvlic acid
- 2-Propenoic acid, n-butyl ester
- Butyl acrylate
- Acrylic acid, n-butyl ester
   Acrylsaeurebutylester
- Butvl propenoate
- n-Butyl acrylate
- Butvl-2-propenoate

### **Product Overview**

- Butyl acrylate is used in the production of coatings and inks, adhesives, sealants, textiles, plastics and elastomers. See Product Uses.
- Acrylic esters, including butyl acrylate, have a very strong, unpleasant odor that may be bothersome. However, the smell of acrylates does not necessarily indicate a health risk.<sup>2</sup> Butyl acrylate is an eye and skin irritant. Prolonged contact of liquid or vapor with eye or skin could result in injury. Butyl acrylate can be absorbed through the skin in potentially harmful amounts and can cause an allergic skin reaction. Vapors can be toxic, and vapor exposure could result in irritation to upper respiratory tract and lungs. Butyl acrylate has a low oral toxicity, but can cause burns to mouth and throat and irritation to the gastrointestinal tract.3 See Health Information.
- Consumer exposure to butyl acrylate is unlikely. Those working with butyl acrylate in manufacturing operations could be exposed during maintenance, sampling, testing, manual transfer, or other procedures. See Exposure Potential.
- Butyl acrylate is a flammable liquid and vapor. Its vapors are heavier than air and may travel a long distance and accumulate in low lying areas. See Exposure Potential.
- Butyl acrylate is stable under recommended storage conditions. Elevated temperatures can cause hazardous polymerization, so butyl acrylate has inhibitors added to reduce the probability of polymerization. See Product Description and Physical Hazard Information.

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#### **Manufacture of Product**

Capacity<sup>4</sup> – In 2004, global industry capacity for acrylate esters, which includes butyl acrylate, was 7.3 billion pounds (3.3 million metric tons). The Dow Chemical Company and its consolidated subsidiaries (Dow) are one of many global producers of butyl acrylate and related chemicals, acrylic acid and esters. Dow has production sites in Louisiana, Texas and Germany.

 Process – Butyl acrylate is normally produced by a simple reaction between acrylic acid and <u>n-butanol</u> (<u>www.dow.com/productsafety/finder/nbut</u>), with water as a byproduct. The reaction is shown below:

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## **Product Description**<sup>5,6,7,8</sup>

Butyl acrylate is a colorless liquid with a sharp odor. It is readily miscible with most organic solvents. Butyl acrylate contains one of the following three inhibitors to prevent polymerization under recommended storage conditions:

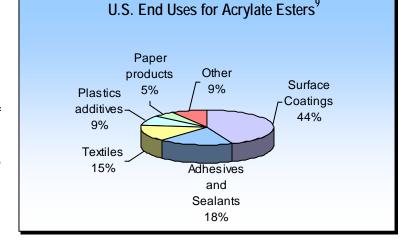
- Hydroquinone (HQ) CAS 123-31-95
- Monomethyl ether of hydroquinone (MEHQ) CAS 150-76-5
- Butylated hydroxytoluene (BHT) CAS 128-37-0

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## Product Uses<sup>9,10,11</sup>

Butyl acrylate is primarily used as a reactive building block to produce coatings and inks, adhesives, sealants, textiles, plastics and elastomers. Butyl acrylate is used in the following applications:

- Adhesives for use in construction and pressure-sensitive adhesives
- Chemical intermediates for a variety of chemical products
- Coatings for textiles and adhesives, and for surface and water-based coatings, and coatings used for paints, leather finishing and paper
- **Leather** to produce different finishes, particularly nubuck and suede
- Plastics for the manufacture of a variety of plastics
- Textiles in the manufacture of both woven and non-woven textiles



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## **Exposure Potential**<sup>12</sup>

Butyl acrylate is used in the production of industrial and consumer products. Based on these uses, the public could be exposed through:

Workplace exposure – Exposure can occur either in a butyl acrylate manufacturing facility
or in the various industrial or manufacturing facilities that use butyl acrylate. It is produced,
distributed, stored and consumed in closed systems. Those working with butyl acrylate in
manufacturing operations could be exposed during maintenance, sampling, testing, manual
transfer, or other procedures. Each manufacturing facility should have a thorough training
program for employees, appropriate work processes and safety equipment in place to limit
unnecessary butyl acrylate exposure. Preferred glove barrier materials include chlorinated

polyethylene, polyethylene, ethyl vinyl alcohol laminate (EVAL), polyvinyl alcohol (PVA), or styrene/butadiene rubber. Consult the relevant <u>Safety Data Sheet (SDS)</u> or see <u>Health</u> Information.

- Consumer exposure to products containing butyl acrylate Dow does not sell butyl
  acrylate 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. See Health Information.
- Environmental releases An acrylate leak, signaled by its strong odor, rarely poses any health risks. 

  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. Evacuate the area and stay upwind of the spill. Ventilate the area of leaks or spills. Only trained and properly protected personnel should be involved in clean-up operations. Eliminate all sources of ignition in vicinity of the spill or released vapor to avoid fire or explosion. Ground and bond all containers and handling equipment. Use appropriate safety and protective equipment. Absorb with non-combustible material such as dirt or sand. Do not use clay absorbants. Consult the relevant SDS for more information about protective equipment and procedures. See Environmental, Health and Physical Hazard Information.
- Large release Industrial spills or releases are infrequent and are generally contained. If a large spill does occur, dike area to contain spill. Contain the spilled material if possible and keep it out of sewers. Ground and bond all containers and handling equipment and avoid all ignition sources. Pump with explosion-proof equipment. If available, use foam to smother or suppress vapors. The material should be captured, collected and reprocessed, or disposed of according to applicable governmental requirements. For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure air line with auxiliary self-contained air supply. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus (SCBA) or positive pressure air line with auxiliary self-contained air supply. Follow emergency procedures carefully. See <a href="Environmental">Environmental</a>, <a href="Health">Health</a> and <a href="Physical Hazard Information</a>.

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### Health Information<sup>14</sup>

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Acrylic esters, including butyl acrylate, have a very strong, unpleasant odor that may be bothersome. However, the smell of acrylates does not necessarily indicate a health risk. Acrylic esters have an extremely low odor "threshold," meaning that even very small amounts in the air can be detected by smell.<sup>15</sup>

Butyl acrylate liquid and vapors may cause slight eye irritation and even slight corneal damage. They may also cause pain greater than expected given the level of irritation.

Brief contact may cause slight skin irritation with local redness. Prolonged contact may cause severe skin irritation with local redness and discomfort. Prolonged or widespread skin contact may result in absorption of harmful amounts and may cause an allergic skin reaction.

Excessive exposure to butyl acrylate vapors may cause irritation to upper respiratory tract (nose and throat) and lungs. Vapor concentrations are attainable which could be hazardous on single exposure.

Butyl acrylate has low toxicity if swallowed, but may result in gastrointestinal irritation or ulceration. Swallowing butyl acrylate may result in burns of the mouth and throat.

Butyl acrylate causes birth defects in laboratory animals only at doses toxic to the mother. It is toxic to the fetus in lab animals at doses toxic to the mother. For specific health information, review the Safety Data Sheet (SDS).

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### **Environmental Information** 16,17

The bioconcentration potential for butyl acrylate is low. It is listed as readily biodegradable by the Organization for Economic Cooperation and Development (OECD).

Butyl acrylate is moderately toxic to aquatic organisms.

For specific environmental information, review the SDS.

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## Physical Hazard Information<sup>18</sup>

Butyl acrylate is a flammable liquid and vapor. Butyl acrylate should be kept away from heat, sparks, flame and any sources of ignition. Its vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur.

### Fire Fighting Instructions

Should ignition occur, extinguish with water fog or fine spray, dry chemical fire extinguisher, carbon dioxide fire extinguisher, or foam.

- Alcohol-resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.
- Personal protection for fire fighters should include positive-pressure, self-contained breathing apparatus (SCBA) and protective fire-fighting clothing includes fire fighting helmet, coat, trousers, boots, and gloves.
- Avoid contact with this material during fire-fighting operations. If contact is likely, change to
  full chemical-resistant fire-fighting clothing with self-contained breathing apparatus. If this is
  not available, wear full chemical-resistant clothing with self-contained breathing apparatus
  and fight fire from a remote location.

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### Reactivity/Stability

Butyl acrylate is stable under recommended storage conditions. Elevated temperatures can cause hazardous polymerization. Polymerization can be catalyzed by the absence of air, the presence of free radical initiators and peroxides, or high temperature. The presence of moisture can also accelerate polymerization rate.

Butyl acrylate contains inhibitors to minimize polymerization under recommended storage conditions. See <u>Product Description</u> or <u>SDS</u>. Maintain inhibitor and dissolved oxygen level. Uninhibited monomer vapors can polymerize and plug relief devices.

Avoid unintended contact with activated carbon or silica gel, which may cause polymerization. Avoid contact with clay-based absorbants, and with incompatible materials, such as:

- Oxidizing materials
- Aldehydes, amines, azides, ethers, free radical initiators, halides, mercaptans, mineral acids, peroxides, rust, strong inorganic bases
- Metals such as brass or copper.

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Additional physical property information for butyl acrylate is available on the SDS.

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### **Regulatory Information**

Regulations may exist that govern the manufacture, sale, transportation, use and/or disposal of butyl acrylate. These regulations may vary by city, state, country or geographic region. Information may be found by consulting the relevant SDS or Contact Us.

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### Additional Information

- Safety Data Sheet (http://www.dow.com/webapps/msds/msdssearch.asp)
- Technical Data Sheet, Butyl Acrylate, The Dow Chemical Company, Form No. 745-00109-1004-AA (<a href="http://www.dow.com/PublishedLiterature/dh\_05b8/09002f13805b88b8.pdf?filepath=acrylates/pdfs/noreg/745-00109.pdf&fromPage=GetDoc">http://www.dow.com/PublishedLiterature/dh\_05b8/09002f13805b88b8.pdf?filepath=acrylates/pdfs/noreg/745-00109.pdf&fromPage=GetDoc</a>)
- The Basic Acrylic Acid Monomers Manufacturers' website (<u>www.bamm.net</u>)
- The European Basic Acrylic Monomer Group (www.petrochemistry.net/templates/shwstory2.asp?TID=10&SNID=62)

For more business information about butyl acrylate, visit the <u>DOW Acrylic Monomers</u> web site (<u>http://www.dow.com/acrylates/index.htm</u>).

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#### References

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- Fact Sheet: Acrylic Acid and the Basic Acrylic Esters, Basic Acrylic Monomer Manufacturers, Inc., March 2003.
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- <sup>8</sup> *n-Butyl Acrylate, Technical Data Sheet*, The Dow Chemical Company, Form No. 745-00109, October 2004, page 1.
- CEH Marketing Research Report Acrylic Acid and Esters, SRI Consulting, 2004, page 35.
- DOW Acrylates website: Applications (www.dow.com/acrylates/app/index.htm)
- Organization for Economic Cooperation and Development (OECD) SIDS Initial Assessment Report for SIAM 15: Butyl Acrylate, United Nations Environment Programme (UNEP) Publications, October 22-25, 2002, page 12.
- n-Butyl Acrylate, Material Safety Data Sheet, The Dow Chemical Company, No. 16, July 13, 2006, pages 5-7.
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- Fact Sheet: Acrylic Acid and the Basic Acrylic Esters, Basic Acrylic Monomer Manufacturers, Inc., March 2003.
- n-Butyl Acrylate, Material Safety Data Sheet, The Dow Chemical Company, No. 16, July 13, 2006, page 10.

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- 8 n-Butyl Acrylate, Material Safety Data Sheet, The Dow Chemical Company, No. 16, July 13, 2006, page 8.

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