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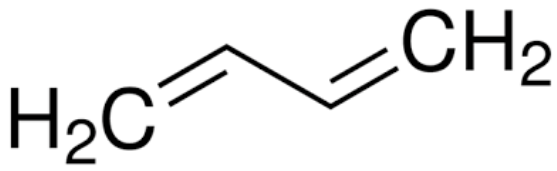
Pollution Prevention

United States
Environmental Protection Agency

Nontechnical Summary of the TSCA Risk Evaluation for 1,3-Butadiene



C_4H_6 (CASRN: 106-99-0)

Why Is EPA Providing This Document?

EPA evaluated the risks of 1,3-butadiene to human health and the environment under the Toxic Substances Control Act (TSCA). This document summarizes the results of the completed risk evaluation for 1,3-butadiene.

What Is 1,3-Butadiene and How Is it Used?

1,3-Butadiene is a colorless gas produced from fossil fuel (petroleum/petrochemical) processing. It is primarily used as a building block to make plastics and synthetic rubbers like latex. Every year, billions of pounds of 1,3-butadiene are produced, imported, and used throughout the United States.

How Can Persons and the Environment Be Exposed to 1,3-Butadiene?

Exposure to 1,3-butadiene may occur in and near workplaces that manufacture plastic materials and synthetic rubber products like tires or that use it in the production of other chemicals. 1,3-Butadiene is primarily released into the air from manufacturing and processing facilities. Workers can be exposed by breathing 1,3-butadiene while making plastic or rubber products or when using 1,3-butadiene in the workplace. Once formed into the final plastic or synthetic rubber product, 1,3-butadiene is not released.

Airborne 1,3-butadiene does not travel far before quickly breaking down into smaller chemicals. It will not settle onto land or into water. 1,3-Butadiene is also formed from burning tobacco, wood, and fuel. As a result, people can be exposed to 1,3-butadiene by breathing in air near manufacturing and processing facilities, from automobile exhaust, fires, as well as from smoking.

Can 1,3-Butadiene Harm People Who Are Exposed?

Based on human studies, exposure to 1,3-butadiene can cause leukemia, a type of blood cancer. Based on laboratory animal studies, exposure to 1,3-butadiene might cause reduced birthweight and anemia[1] in people. Workers and others nearby[2] who breathe excess levels of 1,3-butadiene can also have potential risk for harmful blood effects and reduced birthweight pregnancies. Exposed workers can also be at risk for cancer. Persons living in communities near facilities that release 1,3-butadiene to the air can also have potential risk for these health effects. However, use of household items containing plastic or synthetic rubber made from 1,3-butadiene does not present risk to human health.

Can 1,3-Butadiene Harm the Environment?

Exposure to plants and animals from 1,3-butadiene is not expected through water or soil. Wildlife exposure to 1,3-butadiene released from TSCA facilities via air is expected but not at levels causing harm. Risk to plants from 1,3-butadiene released from TSCA facilities cannot be determined. Therefore, EPA found that 1,3-butadiene does not present an unreasonable risk to the environment under its TSCA conditions of use (COUs).[3]

[1] Anemia is a blood disorder that occurs when the body does not produce enough healthy red blood cells.
[2] Under TSCA, "occupational non-users" (ONUs) are employed persons who do not directly handle the chemical substance but may be indirectly exposed to it as part of their employment due to their proximity to the substance.
[3] Under TSCA, COUs are the specific circumstances, "as determined by the Administrator, under which a chemical substance is intended, known, or reasonably

How Has EPA Assessed 1,3-Butadiene Under TSCA?

The final risk evaluation assessed risks to human health and the environment and risks to the following groups of people, including potentially exposed or susceptible subpopulations (PESS)[4]:

- workers in operations who manufacture and process 1,3-butadiene and workers who use products containing 1,3-butadiene;
- people who live near 1,3-butadiene release sites; and
- people who may be more susceptible to 1,3-butadiene due to age (including young children), sex, genetic predispositions, preexisting health conditions, or other factors.

In December 2024, EPA released the *Draft Risk Evaluation for 1,3-Butadiene* for public comment and external peer review. This final risk evaluation reflects changes made as the result of public comment and external peer review by the Science Advisory Committee on Chemicals (SACC).[5]

What Is EPA's Final Risk Determination for 1,3-Butadiene Under TSCA?

1,3-Butadiene presents an unreasonable risk of injury to human health driven by risk to workers through workplace inhalation exposure under manufacturing/importing, processing, and disposal COUs in the absence of personal protective equipment—including one COU that contributes to unreasonable risk of injury due to inhalation exposure to ONUs. EPA did not identify contributions to unreasonable risk of injury due to exposure to the general population or consumers under any TSCA COU.

EPA did not identify contributions to unreasonable risk of injury to the environment under any TSCA COU.

EPA considered the following factors when determining unreasonable risk from 1,3-butadiene:

- the nature and severity of the health and environmental effects;
- the duration, amount, and frequency of 1,3-butadiene exposures;
- the populations exposed; and
- the Agency's confidence in the risk estimates.

The following 11 COUs significantly contribute to the unreasonable risk of injury to the health of workers through inhalation exposure:

- Manufacturing – domestic manufacturing;
- Manufacturing – importing;
- Processing as a reactant – intermediate (adhesive manufacturing; all other basic organic chemical manufacturing; fuel binder for solid rocket fuels; organic fiber manufacturing; petrochemical manufacturing; plastic material and resin manufacturing; propellant manufacturing; synthetic rubber manufacturing; paint and coating manufacturing);
- Processing as a reactant – monomer used in polymerization process (synthetic rubber manufacturing; plastic material and resin manufacturing);
- Processing – incorporation into formulation, mixture, or reaction product – monomers (plastic product manufacturing; plastic material and resin manufacturing; synthetic rubber manufacturing);
- Processing – incorporation into formulation, mixture, or reaction product

foreseen to be manufactured, processed, distributed in commerce, used, or disposed of."

[4] These (PESS) groups may have higher exposures to 1,3-butadiene or be more likely (predisposed) to be harmed by exposure to 1,3-butadiene.

[5] See EPA-HQ-OPPT-2024-0425 for further information about and a full list of materials reviewed by the SACC.

– plasticizer (asphalt paving, roofing, and coating materials manufacturing);
- Processing – incorporation into article – monomer (rubber product manufacturing);
- Processing – use-non-incorporative activities – fuel (petroleum refineries);
- Processing – repackaging – (wholesale and retail trade fuel; synthetic rubber manufacturing; petrochemical manufacturing);
- Processing – recycling; and
- Disposal.

When applied, typical levels of personal protective equipment (Assigned Protection Factor ≤50) would mitigate the unreasonable risk for 9 of the 11 COUs; for 2 COUs, higher levels of protection would be needed.

A total of 19 COUs do *not* significantly contribute to the unreasonable risk to workers or ONUs, including 2 related to processing, 11 related to industrial and commercial uses, 5 associated with consumer uses of 1,3-butadiene, and distribution in commerce. These are described in the *Risk Evaluation for 1,3-Butadiene*.

How Will EPA Protect Human Health From 1,3-Butadiene Under TSCA?

Following this final determination of unreasonable risk, TSCA requires EPA to propose a regulation to mitigate the unreasonable risk of 1,3-butadiene. After taking public comment on the proposed regulation, the Agency is required to finalize risk management regulations for 1,3-butadiene. Such regulations could include requirements for worker protection, labeling, recordkeeping, or restricting 1,3-butadiene for specific uses.