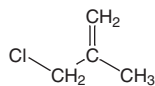


## 3-Chloro-2-Methylpropene

### CAS No. 563-47-3

Reasonably anticipated to be a human carcinogen  
First Listed in the *Fifth Annual Report on Carcinogens* (1989)



### Carcinogenicity

3-Chloro-2-methylpropene is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (NTP 1986, IARC 1995). When administered by gavage, the compound caused increased incidences of squamous cell papillomas of the forestomach in rats and mice of both sexes. Squamous cell carcinomas of the forestomach were increased in male rats and in mice of both sexes.

No data were available to evaluate the carcinogenicity of 3-chloro-2-methylpropene in humans.

### Properties

3-Chloro-2-methylpropene, also known as isobutenyl chloride and methallyl chloride, is a colorless to straw-colored, volatile liquid with a pungent odor. It is insoluble in water, but is soluble in chloroform, acetone, alcohol, ether, and benzene. The technical grade may contain 5% dimethylvinyl chloride. 3-Chloro-2-methylpropene is relatively stable at room temperature, but is flammable at higher temperatures. It reacts vigorously with oxidizing materials and during decomposition by heating, it emits toxic fumes of hydrochloric acid and other chlorinated compounds (NTP 1986, IARC 1995, HSDB 2001).

### Use

3-Chloro-2-methylpropene is used primarily as a chemical intermediate in the production of carbofuran, a carbamate insecticide used mostly on corn; this use accounts for 90% to 95% of the 3-chloro-2-methylpropene produced (Mr. Kipinis, FMC Corporation, Baltimore, MD, telephone conversation with D. Harper, Office of Pesticide Programs and Toxic Substances, U.S. EPA, Washington, D.C., 1984, EPA 1985). It is used in the production of plastics, pharmaceuticals, and other organic chemicals (Sax 1987, Merck 1983, IARC 1995). It is also used in the production of herbicides (5%), as a textile additive (1.8%), and as a perfume additive (0.6%) (EPA 1985). 3-Chloro-2-methylpropene was used as a fumigant for grains, tobacco, and soil, but is no longer used for this purpose (HSDB 2001).

### Production

The 1997 Directory of Chemical Producers lists one company producing an undisclosed quantity of 3-chloro-2-methylpropene (SRI 1997). Although the USITC does not currently list 3-chloro-2-methylpropene (USITC 1995), it did report that one company produced an undisclosed amount of the compound from 1983 to 1988 (USITC 1984-1989). In 1982, the only domestic manufacturer of 3-chloro-2-methylpropene produced 10.5 million lb, and the EPA reported that virtually none of the compound was imported (H. Gaede, Office of Pesticide Programs and Toxic Substances, U.S. EPA, Washington, D.C., telephone conversation with D. Harper, Office of Pesticide Programs and Toxic Substances, U.S. EPA Washington, D.C., 1984). The majority of the compound was used to produce carbofuran. Less than one million lb were sold as a commercial product. In 1978, one manufacturer produced 10 million lb of 3-chloro-2-methylpropene (TSCA 1979). The TSCA Inventory listed one manufacturer in 1977 with a production of 10 million lb. Total production and imports in 1977 were estimated to be 12 million to 24 million lb (TSCA 1979). No export data were available. EPA's Office of Pollution Prevention and Toxics (OPPT) high production volume

chemicals list gives a production volume range of 16.6 to 24.6 million lb (EPA 1985). Fifteen current chemical suppliers of 3-chloro-2-methylpropene were listed for the U.S. (Chem Sources 2001).

### Exposure

The primary routes of potential human exposure to 3-chloro-2-methylpropene are inhalation, ingestion, and dermal contact. Occupational exposure may occur during manufacture of the chemical or while using 3-chloro-2-methylpropene as an intermediate in organic synthesis (NTP 1986). Past use as a fumigant would have resulted in its direct release to the environment (HSDB 2001). Consumers may be exposed by ingesting food products that have absorbed some of the chemical (NTP 1986). As there is only one known U.S. manufacturer, and 90% to 95% of the 3-chloro-2-methylpropene produced is used by this firm to produce carbofuran, the majority of occupational exposure to the chemical is site-limited. The workers are required to wear gloves, which reduces the likelihood of dermal exposure. The average air concentration in the manufacturing plant is 17 ppb (0.013 mg/kg per day worker exposure); chemical operators' breathing zone samples showed an average concentration of 48 ppb. The EPA also reported that consumer exposure appears to be minimal (EPA 1985).

3-Chloro-2-methylpropene was not listed in the National Occupational Exposure Survey conducted by NIOSH from 1981 to 1983. The National Occupational Hazard Survey, conducted by NIOSH from 1972 to 1974, estimated that 1,683 workers were potentially exposed to 3-chloro-2-methylpropene in the workplace (NIOSH 1976). This estimate was derived only from observations of the actual use of the compound. The majority of these potential exposures were probably caused by the presence of 3-chloro-2-methylpropene as a contaminant in carbofuran.

EPA's Toxic Chemical Release Inventory (TRI) estimated that 8,716 lb of 3-chloro-2-methylpropene were released to the environment, specifically to air, by three facilities that produced, processed, or used the chemical in the United States in 1999. One facility accounted for approximately 92% of the total air emissions. Total waste managed included 550,770 lb treated on site and 16,664 lb treated off-site (TRI99 2001).

### Regulations

#### EPA

##### Clean Air Act

NSPS: Manufacture of substance is subject to certain provisions for the control of Volatile Organic Compound (VOC) emissions

##### Emergency Planning and Community Right-to-Know Act

Toxics Release Inventory: Listed substance subject to reporting requirements

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