

Octamethylcyclotetrasiloxane (D4)

This document is a high-level summary intended to provide the general public with an overview of product safety for this substance. It is not intended to replace the Material Safety Data Sheet (MSDS), which is available from suppliers and should be referred to for full details of recommended safety procedures for each type of use. It is not intended to replace or supersede manufacturer's instructions and warnings for their consumer products containing this substance.

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Substance Name and Chemical Identity

Chemical Name:
Octamethylcyclotetrasiloxane

CAS Number:
556-67-2

Common name:
D4

Molecular formula:
 $C_8H_{24}O_4Si_4$

Uses and Applications

D4 is a cyclic organic silicon substance that has been used for the following:

- Use as a monomer ('building block') in the production of silicone polymers. Silicone polymers may be oils, greases, rubbers and resins, and have a wide range of uses.
- Use as an intermediate (starting material) in the production of other organosilicon substances.
- Use in non-metal surface treatment.
- Use in electronics applications.
- Use in textiles applications.
- Use in personal care products.
- Use in household care products.
- Use as a laboratory chemical in research and development activities.

The majority of these applications take place in industrial settings; however, personal care and household care products containing D4 may be used by professionals and consumers.

In personal care products D4 is used as a base fluid or solvent for other larger molecules. It is used in such applications due to being odorless, easy to spread, tasteless, non-greasy and non-stinging. D4 is used in a wide variety of products including antiperspirants, deodorants, skin creams, lotions, bath oils, suntan and shaving products, make-up and nail polishes.

In household care products, much like personal care products, D4 is used as a base fluid or solvent for other larger molecules. Typically, it is used in products such as washing and cleaning products, solid and spray polishes, wax blends, and in automotive aesthetic products.

Physical/Chemical Properties

D4 is a liquid at room temperature and atmospheric pressure, with a melting point of 17.7°C, and a boiling point of 175°C. D4 is a moderately volatile, flammable, high-boiling liquid which is poorly soluble in water. The substance is classified for flammability under the Globally Harmonized System (GHS) as:

- Flammable Liquid Category 3;
'H226: Flammable liquid and vapor'

Property	Value
Physical state	Liquid
Color	Clear
Odor	Odorless
Molecular weight	296.61 g/mol
Melting/boiling point	17.7°C/175°C
Density	0.95 g/cm ³ at 25°C
Vapor pressure	132 Pa at 25°C
Flammability	Yes
Flash point	51 to 61°C
Self-ignition temperature	384 to 387°C at 101.3 kPa
Explosive properties	Not explosive

Health Information

D4 is classified for reproductive toxicity under the Globally Harmonized System (GHS) as:

- Reproductive Category 2; 'H361: Suspected of damaging fertility or the unborn child'

The classification is based on reproductive studies in animals.

Environmental Information

D4 is classified for hazards to the aquatic environment under the Globally Harmonized System (GHS) as:

- Aquatic Chronic Category 4; 'H314: May cause long lasting harmful effects to aquatic life'

D4 is emitted into the air and discharged in wastewater as a result of consumer, commercial, and industrial processing and use. Most of the D4 emitted from processing and use is discharged to the air where it degrades. The remainder of D4 entering the environment is discharged to wastewater. Municipal wastewater treatment processes remove most of the D4 from the wastewater. Any residual D4 discharged to surface water will degrade, evaporate into the air, or bind to solids and be deposited into aquatic sediment. D4 degrades at varying rates in air, water, and aquatic sediment. Various government agencies are assessing the environmental persistence and bioaccumulative potential of D4. Environmental monitoring has detected D4 in aquatic sediment. Scientific studies indicate that the levels of D4 detected in the environment do not pose a significant risk to plants or animals when the substance is used in accordance with the conditions specified in the MSDS.

Exposure Potential

Consumer use of products

containing D4: Consumers may come into contact with D4 while using personal care or household products containing the substance.

D4 concentrations in household care products range from less than 0.1% to up to 50%, although the majority are in the range of 1–5%.

In personal care products, low levels of D4 may be present as an impurity (up to 1–2%) in products containing silicone polymers. D4 may also be present as a base fluid in formulated personal care products at less than 10% by weight.

Workplace exposure: People working in locations where products containing D4 are made or used may be exposed to D4 through contact with the skin and inhalation of D4 that evaporates during processing or use. As with most substances present in the workplace, because of the potential for continuous daily long-term exposure, employers should use appropriate protective measures as set forth in the MSDS, such as adequate ventilation and protective clothing, to reduce the potential for exposure to this substance.

For professional use of products containing D4, such as washing and cleaning products and polishes and waxes, no special handling measures are required. Laboratory applications of the substance involve the use of very small quantities of the material and all procedures are to be carried out in a fume cupboard.

Environmental releases: Consumer and professional uses of personal care products containing D4 result in 100% loss of the substance to the environment. The majority of this loss (90%) is to air, where the substance will degrade; the remainder is lost to wastewater.

Manufacturing occurs under controlled conditions, typically resulting in minor releases to air and wastewater. Releases to the environment from other industrial locations, such as formulation sites, are limited by use of appropriate measures as set out in the Safety Data Sheet or specified by applicable legal requirements.

Risk Management Recommendations

Consumer and professional risk management: Consumers and professionals do not need to take any special precautions when using the substance as intended.

Industrial risk management: Please refer to the Safety Data Sheet for information on protecting workers and limiting environmental exposure at industrial sites, and information on formulating products that are safe for professionals and consumers to use.

Conclusions

The manufacturing and use of D4 does not pose a risk to humans or the environment if instructions in the Safety Data Sheet are followed.

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