

D₅ in Dry Cleaning

Use and Qualities

Decamethylcyclotrasiloxane (D₅) is used as a cleaning agent in dry cleaning. It is an odorless, colorless non-oily siloxane fluid that carries detergent to clothes and rinses away suspended dirt and oils trapped by the detergent. D₅ does not interact with textiles and therefore helps maintain the quality and color of clothes that are dry cleaned.

D₅ Safety Research

D₅ is among the most extensively studied materials used in consumer and industrial applications. Decades of in-depth research on D₅ indicate it is safe when used as intended.

Over 30 studies have been conducted and almost all of these studies showed no effects. However, there were two findings observed in studies with laboratory rats that required further investigation. These two findings, increased liver weight and uterine tumors, were shown to be effects that are specific to rats and that have no relevance to human health.

The increase in liver weight mentioned above was seen after exposure to high concentrations of D₅. This response in rats, which does not affect the animal's health, is well-documented and widely recognized. It is related to an increase of liver enzymes that metabolize and eliminate a material from the body. The increased liver weight reverses even while the D₅ exposure continues. The finding is not adverse, but is considered an adaptive change in rats, and does not represent a hazard to humans.

In a two-year, combined chronic/carcinogenicity study, rats were exposed by inhalation up to the highest possible vapor concentrations of D₅. There were no findings in male rats. Data showed a statistically significant trend for a certain type of tumor (uterine endometrial adenocarcinoma) in female rats exposed at the highest level—a level much higher than the low levels that consumers or workers might encounter. Based on the finding in female rats, silicone manufacturers conducted extensive follow-up research to determine the cause of the finding. Results of this research indicate that the finding seen in the two-year study occurred through a biological pathway that is specific to the rat and is not relevant to humans. Therefore, this finding does not indicate a potential health hazard to humans. This conclusion is supported by an expert panel of independent scientists who reviewed the data from the follow-up research.

Worker Safety

D₅ is safe when used as intended in the workplace. The concentration of D₅ to which rats were exposed in the studies greatly exceeds workplace or consumer exposure from dry cleaning applications when used as intended. Silicone manufacturers have industrial hygiene and worker exposure guidelines that are set to ensure a high level of safety. In addition, the findings seen in the rat studies are not relevant to humans and do not indicate a potential human health hazard.

Silicone Manufacturers' Commitment

D₅ manufacturers are committed to worker and consumer safety. One concrete expression of this commitment is the \$30 million voluntary Siloxane Research Program (SRP) that aims to enhance current knowledge about the safety of siloxanes in consumer and industrial applications. As a part of this program, study methods and results are reviewed by a panel of independent scientific experts, and study results are published in peer-reviewed scientific publications. This initiative represents the largest voluntary health and safety program ever conducted on siloxanes.

Silicone manufacturers continue to communicate the results of this research initiative to regulatory agencies, employees, and customers. Based on the extensive data available for D₅, silicone manufacturers continue to support the safe use of D₅ when used as intended. ■

SEHSC is a not-for-profit trade association comprised of North American silicone chemical producers and importers. For more than 30 years, SEHSC has promoted the safe use of silicones through product stewardship and environmental, health and safety research. The organization also is involved in legislative and regulatory issues relating to silicone materials.