

FACT SHEET

March, 2003

DEHP

Di-2-Ethylhexyl phthalate

DEHP is widely used as a plasticizer in many polyvinyl chloride consumer products as well as medical devices. Because it is not bound to the plastic, it leaches out of the plastic during use, exposing consumers and patients. In laboratory studies DEHP can cause damage to the immature testis at levels to which some critically ill infants might be exposed. At higher levels, it can damage the testis, ovaries, and fetus and can cause reductions in liver and kidney function. Alternatives to most DEHP-containing products are widely available.

Health Effects

DEHP exposure is of greatest concern for the fetus, infant, and women of reproductive age and those with regular exposure to medical devices, such as dialysis patients and hemophiliacs. In laboratory animals, DEHP is a reproductive toxicant that can damage the immature testes and sperm cells. A panel of the National Toxicology Program recently expressed serious concern about risks to premature babies and chronically ill male children who might receive DEHP exposures, from medical devices, that are near or exceed those that cause testicular effects in animals. That panel also expressed concern for pregnant women whose estimated exposures from all DEHP sources might lead to adverse effects on development of offspring. At higher levels of exposure, DEHP also can affect liver and kidney function and damage the ovaries, and fetus, including causing spontaneous abortion, and can be toxic to the heart. DEHP causes tumors and cancer in laboratory animals though its cancer potential in humans is still debated. DEHP also can be toxic to the lungs in laboratory experiments at high doses, and limited human evidence suggests links between DEHP exposure through inhalation and bronchial obstruction. In one recent study, measurable DEHP and metabolite concentrations were found in maternal blood and umbilical cord blood samples, suggesting that fetal exposure is closely related to maternal exposure.

Common Uses

DEHP is used almost exclusively as a plasticizer in otherwise rigid polyvinyl chloride (PVC) plastics. DEHP is used to soften PVC in the production of an array of products including flooring, wall coverings, furniture, footwear, baggage, packaging and other consumer goods, as well as medical devices, such as intravenous bags, tubing and catheters. DEHP-plasticized PVC represents more than 25% of all plastics used in medical devices, which typically contain 30%-40% by weight DEHP.



Because it is not chemically bound to the plastic, DEHP leaches out during use, exposing patients and consumers and causing emissions to the air and waterways. It is a substance widely found in the environment today. People can be exposed to DEHP through air, dust, food, or direct exposure from medical devices.

Alternatives

Alternatives to DEHP-containing PVC products are widely available at competitive cost. For consumer products, PVC that contains alternative plasticizers or PVC-free products are available for most DEHP-containing product categories. For flooring, alternative materials include natural linoleum (made of pine oil and flax), wood, cork, and polyolefin plastics. For wall coverings, polyolefin plastics and textiles can be used. And for other consumer products, polyolefin plastics, textiles, and natural leather can serve as alternatives.

The Food and Drug Administration recently concluded that DEHP exposure may pose a risk to patients through medical devices. PVC-free intravenous tubing, dialysis and feeding bags are already on the market and competing with PVC in terms of production, disposal costs, and performance. One manufacturer of PVC-free intravenous bags commands about 20% of the U.S. market. These alternative products are made from polyolefins, thermoplastic elastomers, ethylene vinyl acetate, ethylene vinyl alcohol, and/or liquid silicone rubber. Research is underway currently for those products (such as tubing and blood bags) where PVC continues to be the dominant material because of its material properties.

References

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United States Food and Drug Administration. FDA Public Health Notification: PVC Devices Containing the Plasticizer DEHP. June 2002. Available at: <http://www.fda.gov/cdrh/safety/dehp.html>.

Additional Resources

Agency for Toxic Substances and Disease Registry (ATSDR): <http://www.atsdr.cdc.gov/toxpro2.html>

Lowell Center for Sustainable Production—Sustainable Hospitals Project: http://www.sustainablehospitals.org/cgi-bin/DB_Index.cgi

Health Care Without Harm: <http://www.noharm.org>

Danish Environmental Protection Agency: <http://www.mst.dk/chemi/01000000.htm>