

# **New York State Department of Health**

## **Tenant Notification Fact Sheet for Benzene**

This fact sheet is provided to fulfill New York State Department of Health (NYS DOH) requirements for preparation of generic fact sheets under Article 27 (Title 24, Section 27-2405) of the Environmental Conservation Law.

### **Benzene**

Benzene is a volatile organic chemical produced from refining petroleum. It is also present in vehicle emissions, cigarette smoke and gasoline, and is produced in the combustion of wood and coal. Benzene occurs naturally from volcanoes and forest fires. Its primary use is as an intermediate to make other chemical products including plastics, rubbers, dyes, lubricants, glues, paints, detergents, drugs and pesticides. Benzene can often be found in air near areas where petroleum products such as gasoline and fuel oil leak or are spilled into the ground.

### **Sources of Benzene in Indoor Air**

Cigarette smoke, household products that contain petroleum distillates, gasoline stored indoors and exhaust from gasoline engines are possible sources for benzene in indoor air. Another possible source of benzene in indoor air is evaporation from contaminated well water that is used for household purposes. Benzene resulting from a gasoline or fuel oil spill may also enter homes through soil vapor intrusion, which occurs when the chemical evaporates, enters soil vapor (air spaces between soil particles), and migrates through building foundations into the building's indoor air. Benzene has also been found at low concentrations in outdoor air, which can also be a source of the chemical in indoor air.

### **Levels Typically Found in Air**

The NYS DOH reviewed and compiled information from studies in New York State as well as from homes and office buildings across the United States on typical levels of benzene in indoor and outdoor air. Levels of benzene are typically around 5 micrograms per cubic meter ( $\text{mcg}/\text{m}^3$ ) in the indoor air of homes and offices. However, it is not unusual for benzene levels to be somewhat higher when petroleum products or products containing petroleum distillates are used or stored indoors or in attached garages. Levels in outdoor air are expected to be less than  $5 \text{ mcg}/\text{m}^3$ .

### **Health Risks Associated with Exposure**

Many studies of long-term exposure to high levels of benzene in workplace air have found associations with leukemia. Several health agencies have concluded that these associations are causal and that benzene is a known human carcinogen. Studies in laboratory animals exposed at high levels over their lifetimes found evidence that benzene causes several types of cancer, including leukemia. Taken together, the human and animal studies indicate that long term human exposure to benzene increases the risk for cancer.

Long term exposure to high levels of benzene in workplace air is linked to effects on the bone marrow, blood and immune system. Studies of long-term exposure in female workers to high levels of benzene suggest exposure could disrupt the menstrual cycle, although these effects are uncertain because of simultaneous exposure to other chemicals and other study design weaknesses. Some humans exposed to large amounts of benzene over short periods of time have had nervous system damage, skin irritation and mucous membrane irritation of the eyes, nose and lungs. Exposure to high concentrations of benzene

damages the blood, bone marrow, immune system, reproductive system and nervous system in laboratory animals. Overall, the human and animal studies indicate that human exposure to high levels of benzene can cause nervous system effects, irritation of the skin, eyes nose and lungs, and that long term exposure to high levels in humans increases the risk for adverse effects on the blood, bone marrow and immune system.

### **NYS DOH Air Guideline**

The NYS DOH has not established a chemical-specific guideline for benzene in air. However, NYS DOH guidance for benzene and other air contaminants is that reasonable and practical actions should be taken to reduce exposure when indoor air levels are above those typically found in indoor air. The urgency to take actions increases as indoor air levels increase. The benzene exposure levels that cause health effects in animals or humans are many times higher than levels typically found in indoor air.

### **Ways to Limit Exposure to Benzene in Indoor Air**

In all cases, the specific actions to limit exposure to benzene in indoor air depend on a case-by-case evaluation of the situation. Removing household sources of benzene and maintaining adequate ventilation will usually help reduce indoor air levels of the chemical. A sub-slab depressurization system can reduce the amount of benzene entering indoor air by soil vapor intrusion. Use of an activated carbon filter on the water supply can reduce the amount of the chemical in contaminated well water that could evaporate into indoor air.

### **Reportable Detection Level**

The reportable detection level for a chemical can vary depending on the analytical method used, the laboratory performing the analysis, and several other factors. Most laboratories that use the analytical methods recommended by the NYS DOH for measuring benzene in air (and approved by the National Environmental Laboratory Accreditation Conference or New York State's Environmental Laboratory Approval Program) can routinely detect the chemical at concentrations below 1 mcg/m<sup>3</sup>.

### **Additional Information**

Additional information on benzene, ways to reduce exposure, indoor air contamination resulting from soil vapor intrusion, indoor and outdoor air levels and the Environmental Conservation Law can be found on the NYS DOH website at

[www.health.state.ny.us/environmental/indoors/air/contaminants/](http://www.health.state.ny.us/environmental/indoors/air/contaminants/).

If you have further questions about benzene and the information in this fact sheet, please call the NYS DOH at 1-518-402-7800 or 1-800-458-1158 (extension 2-7800), e-mail to [ceheduc@health.state.ny.us](mailto:ceheduc@health.state.ny.us), or write to the following address:

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