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## Introduction

Humidifiers are commonly used in homes to relieve the physical discomforts of dry nose, throat, lips, and skin. The moisture they add to dry air also helps alleviate common nuisances brought on by winter heating, such as static electricity, peeling wallpaper, and cracks in paint and furniture. However, excess moisture can encourage the growth of biological organisms in the home. These organisms include dust mites, which are microscopic animals that produce materials causing allergic reactions to household dust, and molds.

Recent studies by the Environmental Protection Agency (EPA) and the Consumer Product Safety Commission (CPSC) have shown that ultrasonic and impeller (or "cool mist") humidifiers can disperse materials, such as microorganisms and minerals, from their water tanks into indoor air. At present, only limited information is available on the growth of microorganisms and the dispersal of microorganisms and minerals by home humidifiers.

Proper care and cleaning of ultrasonic and impeller humidifiers are important for reducing potential exposures to microorganisms, such as bacteria and molds. Microorganisms often grow in humidifiers which are equipped with tanks containing standing water. Breathing mist containing these pollutants has been implicated as causing a certain type of inflammation of the lungs.

The Federal government has not concluded that the dispersal of minerals by home humidifiers poses a serious health risk. Nevertheless, using water with lower mineral content will reduce exposures to these materials.

The young, the elderly, and those people with lung diseases or respiratory allergies may be particularly susceptible to certain types of airborne pollutants. However, if you follow the recommendations for the use and care of home humidifiers provided in this fact sheet, the potential for dispersal of microorganisms and minerals from your humidifier should be reduced.

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## Can I Use Tap Water in My Ultrasonic or Impeller Humidifier?

The Federal government has not concluded that using tap water in ultrasonic or impeller humidifiers poses a serious health risk. However, researchers have documented that these humidifiers are very efficient at dispersing minerals in tap water into the air. In addition, some consumers are bothered by a "white dust" that may appear on surfaces during use of these devices. Most importantly, minerals in tap water may increase the development of crusty deposits, or scale, in humidifiers. Scale can be a breeding ground for microorganisms.

Retarding the growth of scale is the most compelling reason to find alternatives to tap water. For this reason, or if white dust is a problem or you wish to minimize your exposure to minerals in the tap water as a matter of prudence, you should either:

1. Use bottled water labeled "distilled." While distilled water still contains some mineral content, it will likely contain lower mineral content than most tap water. Distillation is the most effective method for removing minerals from water.

Two additional demineralization processes, deionization and reverse osmosis, remove most of the minerals from water, but are generally less effective than distillation. Water demineralized by these two processes would, on the average, be expected to contain a higher mineral content than distilled waters. "Purified" water may be produced by any of these three or other similar processes.

Be aware, however, that not all bottled water is produced using demineralization processes. Bottled waters labeled "spring", "artesian" or "mineral" have not been treated to remove mineral content.

2. Consider using demineralization cartridges, cassettes, or filters if supplied or recommended for use with your humidifier.

Be aware, however, that the ability of these devices to remove minerals may vary widely. Further research is needed to determine how well, and how long, these devices work. Watch for the appearance of "white dust," which would indicate that minerals are not being removed.

Also, in areas of the country where the mineral content in the tap water is high, using distilled water may be less expensive than cartridges, cassettes, or filters.

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## **Types of Humidifiers and Associated Pollutants**

Console humidifiers are encased in cabinets which are designed for floor use. Portable humidifiers are smaller and more readily moved. Central humidifiers are built into heating and air-conditioning systems, and humidify the whole house.

The two types of humidifiers which generally appear to produce the greatest dispersions of both microorganisms and minerals are:

- **Ultrasonic**, which create a cool mist by means of ultrasonic sound vibrations.
- **Impeller**, or "cool mist," which produce a cool mist by means of a high speed rotating disk.

Two additional types of humidifiers can allow for growth of micro-organisms if they are equipped with a tank that holds standing water, but generally disperse less, if any, of these pollutants into the air. These are:

- **Evaporative**, which transmit moisture into the air invisibly by using a fan to blow air through a moistened absorbent material, such as a belt, wick, or filter.
- **Steam vaporizer**, which create steam by heating water with an electrical heating element or electrodes. "Warm mist" humidifiers are a type of steam vaporizer

humidifier in which the steam is cooled before exiting the machine.

**Note:** Steam vaporizer and evaporative humidifiers are not expected to disperse substantial amounts of minerals. A steam vaporizer tested by EPA did not disperse measurable amounts of minerals; evaporative humidifiers have not been tested by EPA for mineral dispersal.

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## Recommendations for Use and Care

It is important to use a humidifier only when conditions require it, to use the correct moisture setting for existing conditions, and to clean it thoroughly.

The possible health effects resulting from the dispersal of microorganisms and minerals by home humidifiers are not fully understood. Meanwhile, it may be prudent to reduce the potential for personal exposures to these materials by taking the following precautions, particularly when using ultrasonic and impeller humidifiers.

- Empty the tank, wipe all surfaces dry, and refill the water in portable humidifiers daily to reduce any growth of microorganisms; follow the manufacturer's instructions for changing water in console humidifiers. Be sure you unplug the unit from the electrical socket first.
- Use water with low mineral content to prevent the build-up of scale and the dispersal of minerals into the air. See the box on the left for information on using water with low mineral content.
- Clean portable humidifiers every third day. Empty the tank and use a brush or other scrubber to clean it. Remove any scale, deposits, or film that has formed on the sides of the tank or on interior surfaces, and wipe all surfaces dry. Again, be sure you unplug the unit.
- Follow the manufacturer's suggestions on the use of cleaning products or disinfectants. In the absence of specific recommendations, clean all surfaces coming in contact with water with a 3% solution of hydrogen peroxide. If you use any cleaning or disinfecting agent, rinse the tank thoroughly with several changes of tap water to prevent dispersal of chemicals into the air during use.
- Follow the manufacturer's directions on cleaning and maintaining console and central (furnace mounted) humidifiers. In particular, if the humidifier contains a tank, do not allow water to stand in the tank for extended periods of time, and keep the water clean.
- Keep steam vaporizer humidifiers out of the reach of children. Steam and boiling water may cause burns.
- Do not humidify to indoor relative humidity levels exceeding 50 percent. Higher humidity levels may encourage the growth of biological organisms in the home. Hygrometers, available at local hardware stores, may be used to measure humidity levels. Some humidifiers contain a built-in humidistat which may be adjusted to the proper moisture level. If water condenses on windows, walls, or pictures, either relocate the humidifier, lower its humidistat setting, or reduce its use.
- Do not permit the area around the humidifier to become damp or wet. If dampness occurs, turn the output volume of the humidifier down. If the humidifier output volume cannot be turned down, use the humidifier intermittently. Do not allow absorbent materials, such as carpeting, drapes, or table cloths, to become damp.

- Follow the manufacturer's instructions regarding the use, maintenance, and replacement of any materials supplied with the humidifier. Use appropriate materials as recommended by the product manufacturer.
- Clean the humidifier, as directed, at the end of the humidifying season or when the product will not be in frequent use. Before storage, make sure all the parts are dry. Dispose of all used demineralization cartridges, cassettes, or filters. Store the unit in a dry location. After storage, clean the unit again and remove any dust on the outside.
- Stop using your humidifier and contact your physician if you have respiratory symptoms which you believe are associated with periods of use of your home humidifier, even if you are following maintenance directions.

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