

Healthy Drinking Waters

for

M A S S A C H U S E T T S

Safe and healthy lives in safe and healthy communities

Aeration Treatment of Drinking Water Supplies

Effective Against:

dissolved gases such as radon, carbon dioxide, some taste and odor problems such as methane, and hydrogen sulfide, as well as volatile organic compounds, like MTBE or industrial solvents. Aeration can be used for the precipitation and removal of iron and manganese. Aeration raises the pH of water.

Not Effective Against:

heavy metals, pathogenic (disease-causing) organisms like bacteria and viruses.

How Aeration Works

Aeration treatment consists of passing large amounts of air through water and then venting the air to the outside. The air causes the dissolved gases or volatile compounds to release from the water. The goal is to allow the contaminants to volatilize into the air. In the case of iron and manganese, the air causes these minerals to precipitate out of solution. The water can then move through a filter to trap the iron and manganese particles.

Air intakes for the aerator can be positioned either outside or inside of the home. First, take a look around the house to identify a clean area for locating the air intake. Avoid areas that have moisture, mold, odors or airborne particles, such as dust from a wood-



© istockphoto.com/Lise Gagne

working shop. For inside the home locations, the intake should be at least a foot above the floor and preferably near the ceiling. If the home is “air-tight” construction, an interior intake location may result in a vacuum being created within the home. This will prevent proper venting of the heating system combustion gases unless a fresh air source is provided.

If the intake is outside the home, the intake should be high enough to avoid contaminant discharges from such activities as power lawn mowers, leaf blowers, automobiles, boiler exhausts, and splash from roof runoff and garden hoses. The intake also needs to be positioned away from the waste air discharge location on the aeration treatment system. At the air intake, you can install an air filter to ensure clean air. Take steps to prevent entry



Aeration Treatment of Drinking Water Supplies

of animals and insects into the intake air.

Waste air from the aerator needs to be disposed of outside the home. This air is now moist and has a higher concentration of the contaminant removed from the water. The waste air discharge point should be above the eave of the roof. Place the vent away from windows and on the downwind side of the prevailing wind direction. The waste air line should include a manufactured vent cap that prevents the entry of dust, bird droppings, small animals, and other bacterial hazards.

Mist will carry over from the aerator into the waste air vent line and condensation may also occur. Both the intake and waste air line need to be sloped to allow drainage of moisture. The waste air line connections need to be air tight within the home to prevent leakage of hazardous gas.

Maintenance

Regardless of the quality of the equipment purchased, it will not perform satisfactorily unless maintained in accordance with the manufacturer's recommendations for maintenance, cleaning, and part replacement. Keep a logbook to record equipment maintenance and repairs.

Proper, adequate ventilation is a must when operating an aeration system. The tank needs occasional cleaning of precipitated sulfur, iron sulfide, rust, and algae. A valve controlled drain line to the ground surface makes flushing the storage tank, once or twice each year, easier.

Other Considerations

Ensure the system you choose is installed and operated according to the manufacturer's instructions. After installation, retest both the raw water (prior to treatment) and the treated water at a state certified laboratory to ensure it is working properly and removing



©istockphoto.com/Alexander Hafemann



©istockphoto.com/Suprijono Suharjoto



©istockphoto.com/Joe Gough

the contaminants. You should continue to test the quality of both the raw and treated water annually or more frequently (quarterly or semi-annually) if high levels of contaminants are present in the raw water. Frequent testing will also help you determine how well your treatment system is working and whether maintenance or replacement of components may be necessary.

If there are elevated levels of dissolved iron or manganese in the water, the aeration process can cause rust and other solids to form, staining plumbing fixtures and clothing unless a post-treatment filter is installed to trap the solid forms of iron and manganese. On the other hand, if the raw water coming into the house contains elevated levels of iron and manganese in its solid, precipitate form, a filter may need to be installed before the water enters the aeration system.

Bacterial slime may grow in aerators, requiring continuous or periodic chlorination.

Chlorination may oxidize iron and cause it to precipitate out, requiring the need for a filter to remove the iron particles.

The advantage of aeration is that there is no disposal or regeneration of treatment media necessary. This is especially important when the contaminant being treated would constitute a hazardous waste disposal problem, such as radon.

Questions to Ask Before You Buy

Before purchasing a water treatment device, have your water tested at a state certified laboratory to determine the contaminants present. This will help you determine if aeration is an effective treatment method for your situation. See the fact sheet *Questions to Ask When Purchasing Water Treatment Equipment* for more information.

Consumers should inquire about the following before purchasing an aeration system:

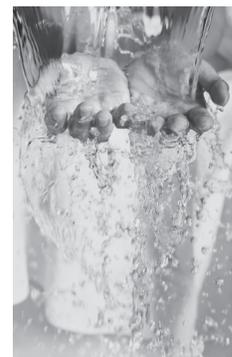
- Has the treatment system been tested and certified by a third party to ensure that it meets manufacturer's claims?
- What maintenance requirements are there?
- Are there any special installation requirements that may add to the equipment cost, for instance changes to your household plumbing?
- How loud is the air blower? Will sound-proofing be required?
- How much electricity does the blower require? Is it energy efficient?

Product Certification

NSF International is a non-profit organization that sets performance standards for water treatment devices. Because companies can make unsubstantiated statements regarding product effectiveness, the consumer must evaluate test results of the device to determine if claims are realistic. Products that have been tested or evaluated by NSF and meet their minimum requirements are entitled to display the NSF listing mark on the products and in advertising literature for products. Manufacturers and models that meet NSF's standard are included in a listing published twice a year. For more information contact NSF at: 800-NSF-MARK (800-673-6275) or <http://www.nsf.org/consumer/>



©istockphoto.com/Tommy Maenhout



©istockphoto.com/Mike Manzano

Resources

UMass Extension

This fact sheet is one in a series on drinking water wells, testing, protection, common contaminants, and home water treatment methods available on-line at the University of Massachusetts website:

http://www.umass.edu/nrec/watershed_water_quality/watershed_online_docs.html
and Cape Cod Cooperative Extension:
508-375-6699
<http://www.capecodextension.org>

MA Department of Environmental Protection, Division of Environmental Analysis

Offers assistance, information on testing and state certified laboratories: 617-292-5770
For a listing of MassDEP certified private laboratories in Massachusetts:
<http://www.mass.gov/dep/service/compliance/wespub02.htm>

U.S. Environmental Protection Agency, New England Office

Information and education on where drinking water comes from; drinking water testing and national laws; and how to prevent contamination:
<http://www.epa.gov/ne/eco/drinkwater>

US Environmental Protection Agency

For a complete list of primary and secondary drinking water standards:
<http://www.epa.gov/safewater>

MA Department of Conservation and Recreation, Division of Water Supply Protection

Maintains listing of registered well drillers, information on well location and construction: 617-626-1409
<http://www.mass.gov/dcr/waterSupply/welldrill/index.htm>

NSF International

The NSF International has tested and certified treatment systems since 1965. For information on water treatment systems: 800-NSF-MARK (800-673-6275)
<http://www.nsf.org/consumer/>

Water Quality Association

The Water Quality Association is a not-for-profit international trade association representing the household, commercial, industrial, and small community water treatment industry. For information on water quality contaminants and treatment systems:
<http://www.wqa.org>



This publication is adapted from a URI fact sheet by the same name produced by the Rhode Island Department of Health and the University of Rhode Island Cooperative Extension Water Quality Program.

UMass Extension is an equal opportunity provider and employer, United States Department of Agriculture cooperating. Contact your local Extension office for information on disability accommodations or the UMass Extension Director if you have complaints related to discrimination, 413-545-4800.

This project was funded, in part, by a grant from US EPA.

This material is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Agreement No. 2004-51130-03108.

06/01/07

