How to buy a radon aeration system…

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Introduction-

There are three general types of aeration system presently available. They are Shallow Tray® aeration, diffuse bubble, and re-spray units. This article will not address the re-spray technology because its removal efficiency is low compared to Shallow Tray or diffuse bubble and, therefore has a more limited use.
Both the Shallow Tray® and diffuse bubble systems force air into the water. The agitation that results releases the radon gas from the water in a similar fashion to that of shaking up a carbonated drink to release dissolved carbon dioxide. The air and the radon gas are then vented through a stack to an area above the roof where it can be safely released. Both of these systems require a repressurization pump to send the water to the house and at least one float switch to control a solenoid valve that keeps the aeration tank full. The main differences between the two systems is the depth of water used and the size of the openings in the aerator.
The Shallow Tray® uses a tray that has 3/16" holes through the bottom. The tray has solid vertical dividers that provide a path width of approximately 2". Water is sprayed onto the tray to a depth of 2". The air passing up through the holes in the tray suspends the water on the tray. At the end of the path the water drops into the bottom of the aeration unit where it can be pumped to the house.

Diffuse bubble aeration works like an air stone in a fish tank. Air is forced through a series of small opening in what can best be described as a wand that extends into to the water to a depth of 10" to 15". The diffuse bubble systems usually consist of a single tank with one or more baffles to separate each aeration wand.

In deciding what to buy you should consider the answers to the following questions:

How much will the radon concentrations be reduced?

The contractor providing you with any type of water treatment equipment should be able to provide you with a written performance warranty. This performance should not be just a statement about being free from defects but a statement about the quality of the water that will be produced. Aeration system performance can be modeled with computer programs to tell you what removal efficiency the system will provide. This information should be provided in writing on a sheet that identifies the manufacturer as providing this information, the model # of the unit, and conditions under which this performance can be expected. **If the contractor is reluctant to provide you with this information it probably is not available and the unit he is selling has not been thoroughly tested.**

Does the unit have an auxiliary fan?

Although the EPA does not have specific guidelines for radon water systems, it does require that radon systems be maintained under negative pressure by placing a fan on the outside of the building. This is done to prevent the high concentration of gas that is generated in the aeration tank from being forced back into the building through any leak that may develop. Most aeration systems have a blower mounted on the unit that pressurizes the system. Under these pressurized conditions, any leak would release high concentrations of radon gas into the home. To prevent this and **to satisfy the EPA mitigation standards the system needs to have an auxiliary fan on the outside of the building to maintain negative pressure in the system.**

What is the vent size?

The diffuse bubble system uses a minimum of a 2" stack and the Shallow Tray system uses a minimum of a 3" stack. The smaller the vent size the easier the installation, however, this is not the only consideration. It is more important that the stack be sized so that in cold climates there is no possibility of freezing and the auxiliary fan can maintain negative pressure. The smaller stack sizes will allow the moisture generated in the vent to create frost and ice that will restrict the flow. This along with the already small stack will create enough restriction to prevent the auxiliary fan from maintaining negative in the vent stack and aeration tank. Make sure to ask your contractor how he will size the pipe and if the system will be checked for its ability to maintain negative pressure.

Where will the vent be run?

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The stacks for these systems must be installed so that they do not contain water traps. This means the pipe must continually drain back to the aeration tank with no low spots that could hold or collect water that would block the vent. There is also a limit on the length of pipe that can be run. This length is measured as an equivalent length. The equivalent length will depend on the number of elbows as well as the length of straight pipe that must be used to route the pipe out of the building. **Your contractor should show you the route the pipe will take, explain how it will be routed to prevent water traps and explain how he has calculated the equivalent length of the vent stack.**

What flow rates/pressure will be delivered to the house?

Make sure you understand what rate (gallons/min) and pressure the water will be delivered to the house. Most of these systems are restricted to flows based on the removal rate that is required. The higher the flow through the aeration system the lower the removal rate. **Make sure the contractor is willing to put in writing the flow and the pressure at which the water will be delivered.**

What type of pump will be used?

Aeration systems increase the oxygen content of the water and therefore will oxidize any iron that is dissolved in the water. This is why it is a good idea under some water conditions that the repressurization pump not be made of cast iron. Check with your contractor to see if this is a problem for your water and if he can provide an optional stainless steel pump.

What type of maintenance will be required?

Most manufactures recommend disinfection be done at least every six months. Other than this it is recommended that once a year you have the unit inspected, its mechanical functions checked, aeration tank cleaned and perform two water radon tests(treated and untreated at the same time). There may be air filters and cartridge filters that need to be changed at the time of this service. Check with your contractor to determine what your system will need.

How much will the electricity cost to operate the system?

Most of these systems will operate on anywhere for $40-$60 per year.

What about references and experience?

These systems should be installed by professionals to be sure they continue to operate efficiently and quietly. Please be sure you get references and talk to references before hiring a contractor. A good contractor is as important to the final result as is the choice of the right equipment.

Conclusion-

Please remember this is a lifetime investment. You will be creating a long term relationship with the company that installs your unit. You need to feel comfortable with them and the equipment you choose. A few extra dollars spent up front can save you many years of aggravation. The following list will help you keep the important points in mind as you go through your decision process.

- Get the performance rating of the system.
- Be sure the system will maintain negative pressure.
- Make sure the vent stack is large enough.
- Find out where and how the vent stack will be run.
- Check to see how much water you will get.
- Make sure your contractor is experienced.