DOES SIZE REALLY MATTER?

Proper sizing for point of entry water treatment equipment installation

by Emily Watkins,
CEO/ VP of the Operations, Jason's Water Systems

Have you ever wondered if size really does matter? Well, considering the language in plumbing codes, it does when talking about installing a point of entry whole house water softener in a home. Purchasing a home is typically one of the largest consumer investments. The first few weeks in a new home are spent doing everything to protect it. New homeowners purchase new décor, set up and/or inspect security, fire, and carbon dioxide alarms, and depending on the water quality, protecting their appliances from hard water issues is just as important. However, purchasing the correct sized water system can be challenging. Purchasing the wrong sized water treatment equipment is similar to purchasing a new car and expecting gas efficiency of 30 miles per gallon, but later realizing the car is only getting 17 miles per gallon. This is the exact reason why the water treatment and plumbing industry must take a deeper look at what plumbing codes require when purchasing and installing a new water system for a residential home.

The plumbing codes contain a compilation of requirements based on stated scope and is intended for adoption as primary law by a governmental unit to address an area of regulatory focus. Plumbing codes have been created for the consumer's protection. The water treatment industry has noticed that some installers and inspectors ignore the sizing requirements for proper installation of point of entry water treatment equipment. Installing an undersized water system in a home may cause a number of issues for the homeowner. The water pressure may be reduced to appliances, causing them to not function properly; reduced flows may occur when filling a bathtub; and during peak water demand, the equipment may not be treating all of the water as expected or advertised. This is why it is imperative that all aspects of plumbing codes are followed when purchasing and installing a point of entry water treatment system.

Per the plumbing codes, proper sizing in regards to the home's water demand is based on the total fixture count within a home. This fixture count data will give you the specific water demand that the house needs access to at all times. The codes contain three sizing requirements for water treatment equipment:

1) Where a water filter, water softener or similar device is installed in a water supply line, the pressure loss through such devices shall be included in the pressure loss calculations of the system, and the water supply pipe and meter shall be adequately sized to provide for such a pressure loss.
2) No water filter, water softener, or similar device shall be installed in potable water supply piping where the installation of such device produces an excessive pressure drop in such water supply piping.

3) In the absence of specific pressure drop information, the diameter of the inlet or outlet of such device or its connecting piping shall be not be less than the diameter of such water distribution piping to the fixtures served by the device.

Although pressure drop information and flow rate information is made available by manufacturers and certification agencies, often times installers and inspectors solely rely on matching the pipe size with the control valve, neglecting the pressure loss caused by the water treatment equipment itself.

The water industry has done an excellent job prescribing specific test standards for water treatment systems. These standards contain four main sections:

1) **Material Safety**
This section ensures that the materials that contact drinking water are safe.
2) **Structural Integrity**
This section ensures that the product is structurally sound and will not break because of high water pressure or water hammer.
3) **Performance**
This section evaluates the performance requirements marketed by the manufacturer, such as chemical reduction, flow rates, and pressure drop.
4) **Product Literature**
This section prescribes numerous informational specifications that must be included in the installation manual, data label, and performance data sheet.

The two primary test standards that a water treatment system will fall under are:

- NSF/ANSI 42, *Drinking Water Treatment Units - Aesthetic Effects*
- NSF/ANSI 44, *Residential Cation Exchange Water Softener*

Product testing and certification to these standards only provide a piece of the information needed to meet the plumbing code. They do not solely reflect the total criteria needed in meeting plumbing codes. It is important for the installer and inspector to ensure that the water treatment equipment not only complies with the standard, but that they also comply with the remaining necessary requirements to meet the plumbing code.

A water treatment system will go through multiple levels of testing to confirm whether the product will qualify to meet the standards set by the plumbing code, but the true test comes when the water treatment system is installed on a home. To completely follow the plumbing code, you must cross-reference the data between the home's maximum water demand with the water system's maximum flow rate per its test data from NSF/ANSI 42 and/or NSF/ANSI 44. This ensures that the plumbing code is not violated or compromised at the time of installation. To be sure that the benchmarks set by the plumbing code have all been met, one must be sure that the water system and its completed install reflect the required performance standard, that it's correctly sized in accordance to the home's plumbing demand, and its drain connection all comply with the code.

The plumbing code provides the following criteria when installing a water treatment system:

- **Application:** Water treatment units shall be tested by NSF 42 or NSF 53, and water softeners shall comply with NSF 44.
- **Airgap Discharge:** Discharge from water treatment unit shall the enter drain through an airgap.
- **Connection Tubing:** Tubing to and from water treatment shall be of size recommended by the manufacturer. The tubing shall comply with the requirements of NSF 14, NSF 42, NSF 44, NSF 53, NSF 55, NSF 58 NSF 62 or the appropriate material standards referenced in Table 1701.1.
- **Sizing of Residential Softeners:** Connection of ¾ inch or 1 inch for bathrooms ranging from 2-4 in a home.

Once again, having a water treatment system tested to the NSF 42 and/or NSF 44 standards and marked for conformance does not ensure compliance with the plumbing codes. All requirements listed above must be met at the time of installation in order to demonstrate total plumbing code compliance. This means that when installing or inspecting a water treatment system you have to look beyond their labels showing NSF 42 and NSF 44. You must also ensure proper sizing to the home's demand and drain connection. After all ... the codes are created for the consumer's protection! Therefore, everything should be reviewed at the time the system is completely installed to confirm that all plumbing requirements have been met for each individual home.

So, yes – size does matter! The size of the home's maximum water demand and the size of the water treatment system's maximum flow both matter in order to meet the plumbing codes.