Valli Vue Hard Water and Your Plumbing

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Valli Vue has hard water that is tasty but can adversely affect appliances and plumbing. Heating or evaporating hard water can cause dissolved solids to precipitate and deposit as scale. On-demand water heaters seem especially susceptible to scale buildup, but any water-using appliance could be affected. To avoid problems, follow appliance-manual recommendations for water quality and descaling procedures.

History

Valli Vue water has always been classified as "very hard", but its chemical composition typically results in little encrustation of fixtures and plumbing, and most homeowners have chosen to use it unsoftened. Although scale buildup in hot water heaters and boilers is perhaps the biggest potential problem, tank-style hot water heaters have lots of room for scale flakes to settle to the bottom, and boilers are typically closed systems and therefore accumulate only a small amount of scale. Thus, our hard water has not been problematic historically.

On-Demand Hot Water Heaters

Some homeowners have been switching to energy-efficient on-demand water heaters, where water is heated as needed as it flows through a length of pipe wrapped with heating elements. With no tank, there is no energy loss related to storage of hot water, but there is also no sump to hold any produced scale; instead, it will eventually flake off and travel downstream. Little flakes may merely hang up in faucet aerators, but larger flakes could cause problems with the faucets themselves.

A result of the loss of water pressure in the Valli Vue water system last summer was that one homeowner with an on-demand hot water system experienced mobilization of a substantial quantity of scale. With flakes and pieces of greenish-white stuff clogging his faucets, he had to go to significant time and expense to thoroughly purge his plumbing.

One manufacturer of these systems (Noritz) states that “Water hardness levels in excess of 12 grains per gallon entering the heater will significantly affect its performance and void your warranty.” Because hardness is an unregulated secondary water quality parameter, it is the responsibility of the homeowner to determine the suitability of the water supply in this regard for all appliances. By extension, a good plumber should be asking about hardness on behalf of the homeowner. Softening the water is an option but increases the sodium concentration, which may have undesirable health effects and will adversely affect our tasty deep well water.

Valli Vue Water Hardness

The annual water quality report distributed to homeowner describes our water quality with respect to primary contaminants, which must not exceed regulatory levels, but does not provide information on secondary characteristics because there is no regulatory requirement to do so. To fill this data gap as a service to homeowners, the Valli Vue water system contractor (Northern Utilities) collected a water sample from the system and submitted it for certified analysis of secondary characteristics that may be of concern to residential plumbing systems.

Secondary water quality parameters are presented in Table 1. Hardness at 12.86 grains exceeds the Noritz guideline for on-demand water heaters, and the positive Langelier Index indicates that scale is likely to form (better than the alternative; a negative value would indicate a tendency to corrode metal pipes and fixtures).

Total dissolved solids (280 mg/L) exceeds hardness (220 mg/L), which points to the presence of another dissolved metal in addition to the calcium and magnesium used to calculate hardness. Because iron and manganese are absent (our water won't leave rust stains), sodium is probably the predominant mystery metal. This putative sodium content may explain why encrustation and water spotting generally aren't problematic.

Table 1
Secondary Characteristics of Valli Vue Water

Parameter	Result	Units
Sample Date	11/14/2016	–
Hardness	220 or 12.86	mg/L $CaCO_3$ grains per gallon
pH	7.63	standard units
Alkalinity	172	mg/L $CaCO_3$
Langelier Index	0.23	C units (greater than zero indicates $CaCO_3$ supersaturation)
Total Dissolved Solids	280	mg/L
Calcium	65	mg/L
Magnesium	13	mg/L
Iron	ND [< 0.040]	mg/L
Manganese	ND [< 0.020]	mg/L

mg/L = milligrams per liter
ND = nondetect

Consult Your User Manual

In addition to water heaters and boilers, any other appliances that heat or evaporate water can be prone to scale buildup or hard water deposits. Such appliances include dishwashers, coffee makers, humidifiers, steam irons, and others. Equipment user manuals specify the water quality range that is acceptable without softening, and usually contain guidance on descaling procedures and recommended frequency. PLEASE BEWARE. Each device will have its own allowable limits for water quality, and warranties are typically void if guidance is not followed. The following link provides further information on hardness in water and is a good resource:

http://www.water-research.net/index.php/water-treatment/tools/hard-water-hardness.

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P.S. Dishwashers and hard water -- to combat hazy glassware affected by our hard water, I add 1/3 cup vinegar to the dishwasher in a custard cup on the top rack with each load. This results in a slightly acidic first rinse, dissolving the $CaCO_3$ that otherwise builds up and turns new glasses hazy and old-looking in a few weeks. -Dave W.