Message From the Manager: Water Heaters

Hello, this is Paul Tischler, General Manager of Sardis-Lone Elm Water Supply. Yes, if you ask me what time it is, I have been known to tell you in return how to build a watch! I am frequently asked questions like "why do the screens on my shower heads get clogged?" or "why do I constantly have to clean the screen on my kitchen faucet?". Not all customers experience these problems, but some do and they are not isolated to just this water system. I wanted to take the time to explain the causes and solutions from both a water provider's and a home-owner's point of view.

Not all water is the same. Water supply sources are regional by nature and quality can vary a great deal. Surface water in our area comes from Joe Pool Lake, Cedar Creek reservoir, and Richland Chambers reservoir. Groundwater supplies come from both the Trinity and Woodbine aquifers. Why does this matter to a water heater? When it comes to heating water, its all about the Total Dissolved Solids (TDS). Examples of dissolved solids are calcium, magnesium, sodium, etc. All water supplies have TDS; however, surface water supplies typically have lower amounts where groundwater supplies are usually higher. Sardis Lone Elm currently provides a blended supply. From 1964-2008, we relied 100% on groundwater and then surface water was introduced in 2009. As of 2026, the ratio of ground to surface water has changed to a 50/50 blend. Due to limited supply in the aquifers, no new groundwater sources will be added, and the ratio will continue to evolve where the majority of the water supplied will be from surface water sources. Simply put, as new homes are added to the system, more treated surface water will be purchased. Currently, the TDS content of our blended supply averages 500 mg/l. For perspective, State regulations call for a maximum Total Dissolved Solids (TDS) content in potable water to be less than 1,000 mg/l.

How does TDS affect conventional water heaters? As water is heated, dissolved solids will precipitate out of solution and settle in the bottom of the tank as sediment. The higher the temperature, the more sediment will occur. Typically, anything over 140F will make the sediment much worse. If you are constantly having to clean the screens on your shower heads and kitchen & bathroom faucets, your water heater may be set too high. Please be mindful that 140°F water can cause scalding accidents and burns, especially with the elderly and children. Temperature limiting fixtures such as bathtub faucets and shower mixers can help reduce risk of scalding even further. Be careful though, the CDC recommends at no point should the water be below 120° due to the possibility of bacteria growth. Heat dissipates the disinfectant residual (chlorine) in the water and bacteria can thrive in a warm environment. So, having the temperature set in your water heater between 120°-140° will prevent the possibility of bacteria growth while also greatly reducing mineral sediment. Some heating element switches on water heaters have a scale between 110°-160°, while others just say "High, Medium, Low". A good way to dial-in the desired temperature is to run the hot water at a sink closest to the water heater for 3-4 minutes and then measure the temperature with a cooking thermometer. It is important to know the maintenance recommendations that are supplied in the manual that pertains to your particular unit. Most manufacturers suggest

flushing conventional water heaters on an annual basis to help prevent corrosion and extend the life of the heater. My personal opinion is that 130°F is the best setting.

Now, let's discuss the alternative to conventional. Tankless water heaters are different in that they superheat the water through a coil system on demand with no storage. This method causes a scale buildup on the inside of the coils from dissolved solids. The scale continues to build until eventually, it either breaks off and ends up in the screens of your shower heads and faucets, or it closes off the coils and prevents water from flowing. Scale buildup will also greatly affect the efficiency of the heater because water is coming into contact with the scale instead of the metallic coils, making the heater work harder only to heat the water less. Please do not confuse the word "tankless" with the phrase "maintenance free". Where conventional water heaters have the storage capacity for scale and solids to accumulate in the bottom of the tank, tankless heaters do not and the effects of scale and solids will be seen more rapidly. The manual that came with your tankless water heater will contain maintenance procedures that recommend cleaning your heater on at least an annual basis or more frequently depending on the dissolved solids content of the water. Most heaters will come with a maintenance port that allows for a vinegar solution to be pumped through the heater which will dissolve the scale and discharge into a bucket. Please check with the manufacturer of your particular unit for more information. There are also scale inhibitor systems on the market that are installed on the cold-water line prior to the tankless water heater. These devices prevent scale from forming in the heater. Research the internet by searching for "tankless water heater scale inhibitor", "tankless water heater maintenance", "tankless water heater scale", etc. and you will find more information than you can imagine. I have included pages from both a Rinnai and a Rheem Installation and Operations Manual for reference. They both reference Total Dissolved Solids and offer the following suggestions for additional equipment:

- Rinnai recommends the "Scale Cutter Water Conditioning System. I found these on the Home Depot website at https://www.homedepot.com/p/Rinnai-ScaleCutter-3-4-in-Water-Softener-for-Tankless-Water-Heaters-and-Combi-Boilers-103000038/308668262
- Rheem recommends the "AllClear Water Treatment Kit" which I found at https://parts.rheem.com/product/RPD-RTG20251/sfes-scalestick-water-treatment-service-part-kit?srsltid=AfmBOoqWLRo0w6RFjHZ5DqDBTPwT6gnUbFgxed6IAealzPnP_QFstFcw

Please know that water heater sediment and scale is not isolated to just Sardis-Lone Elm Water Supply customers. All water systems in the USA have dissolved solids. All water heaters need routine maintenance. Yes, conventional water heaters can be neglected to a point because of their storage capacity. Yes, scale will show itself faster in a tankless water heater. There are advantages and disadvantages to both types of heaters. Do the research and make an informed decision. Or, if your water heater has already been purchased, know the maintenance procedures and intervals. A little bit of maintenance can greatly extend the life of both appliances!!!

4.3 Choose an Installation Location

When selecting an installation location, you must ensure that all water heater and venting clearances will be met and that the vent length will be within required limits. Consider the installation environment, water quality, and the need for freeze protection. Requirements for the gas line, water lines, electrical connection, and condensate disposal can be found in their respective installation sections in this manual.

4.3.1 Water Quality Guidelines

This section provides information on the importance of water quality to the Rinnai Tankless Water Heater. The information is intended to serve as a general guide only and is not a complete list of water quality guidelines.
Consideration of care for your water heater should include evaluation of water quality. The water must be potable, free of corrosive chemicals, sand, dirt, or other contaminants. It is up to the trained and qualified professional to ensure the water does not contain corrosive chemicals or elements that can affect or damage the Rinnai Tankless Water Heater. Water that contains chemicals exceeding the levels listed below can damage the Rinnai Tankless Water Heater. Replacement of components due to water quality damage is not covered by the warranty.

If you install this water heater in an area that is known to have hard water or that causes scale build-up, the water must be treated and may require a more frequent flushing schedule. This water heater includes a service indicator (Service Soon, 55). When selected in the parameter settings, an 55 code will display on the controller indicating that it is time to flush and service the water heater. Scale build-up is caused by hard water and can be accelerated if the water heater is set at a high temperature. Rinnai offers Southeastern Filtration's "ScaleCutter Water Conditioning System" that offers superior lime scale prevention and corrosion control.

Table 5: Water Quality Guidelines

Contaminant	Maximum Level
Total Hardness	Up to 200 mg/L
Aluminum *	Up to 0.2 mg/L
Chlorides *	Up to 250 mg/L
Copper *	Up to 1.0 mg/L
Dissolved Carbon Dioxide (CO2)	Up to 15.0 mg/L
Iron *	Up to 0.3 mg/L
Manganese *	Up to 0.05 mg/L
pH *	6.5 to 8.5
TDS (Total Dissolved Solids) *	Up to 500 mg/L
Zinc *	Up to 5 mg/L

*Source: Part 143 National Secondary Drinking Water Regulation

4.3.2 Environment

Air surrounding the water heater, venting, and vent termination(s) is used for combustion and must be free of any compounds that cause corrosion of internal components.

These include corrosive compounds that are found in aerosol sprays, detergents, bleaches, cleaning solvents, oil-based paints/varnishes, and refrigerants. The air in beauty shops, dry cleaning stores, photo processing labs, and storage areas for pool supplies often contains these compounds. Therefore, it is recommended that external (outdoor) models be used for these locations where possible. In applications utilizing room air where there are high levels of particulates, Rinnai offers a room air screen.

The water heater, venting, and vent termination(s) should not be installed in any areas where the air may contain these corrosive compounds.

Water Quality

Water quality must be taken into account when installing and maintaining the water heater. Water conditions outside of the levels specified below affect and may damage the water heater. **Please note that the limited warranty provided with the water heater does not cover defects, malfunctions or failures resulting from water conditions that are not in accordance with the specifications in the table below.**

If you nonetheless install this water heater where the water conditions are not within the levels specified in the table below, Rheem recommends that you take the following steps:

- Install a water treatment device or water softener at the same time as the original installation of the water heater. Rheem offers a water treatment accessory that can be installed with the water heater. (See below).
- Flush the water heater's heat exchanger regularly. Rheem offers a flush kit and isolation valves to help remove scale build up. (See below)

Chart for Recommended Water Quality Levels									
pH	(Total Dissolved Solids) TDS	Free Carbon Dioxide (CO_2)	Total Hardness	Aluminum	Chlorides	Copper	Iron	Manganese	Zinc
6.5–8.5	Up to 500 mg/L	Up to 15 mg/L	Up to 200 mg/L	0.05 to 0.2 mg/L	Up to 250 mg/L	Up to 1.0 mg/L	Up to 0.3 mg/L	Up to 0.05 mg/L	Up to 5 mg/L

Cited reference: National Secondary Drinking Water Regulations

Accessory part numbers listed below. See Parts and Accessories Catalog for more information.

	Accessory Kit	Replacement Filter	Tankless Flush Kit	Tankless Isolation Valve
AllClear Water Treatment Kit	RTG20251	RTG20252	RTG20124	RTG20220AB
Scale Prevention Device	RTG20246	RTG20247		

Water Supply

⚠CAUTION:

This water heater MUST ONLY be used with the following water supply conditions to prevent product damage and operation failure.

Clean, potable water free of corrosive chemicals, sand, dirt, or other contaminates.

Inlet water temperatures above 32°F (0°C), but not exceeding 120°F (49°C).

DO NOT reverse the HOT and COLD water connections.

DO NOT connect this heater to water lines previously used for space heating. All water piping and components shall be suitable for potable water.

With recommended water quality (See chart above).

Thermal Expansion

A thermal expansion tank will be required if the water heater is installed in a system with a recirculation or storage tank. This prevents damage to the heater, related piping, and the relief valve.

NOTICE:

Replacing the relief valve will not correct the problem!

The expansion tank is designed with a built-in air cushion that compresses as the system pressure increases. This relieves the over-pressure condition and eliminates the repeat operation of the relief valve.

For other approved methods of thermal expansion, contact an installing contractor, water supplier, or plumbing inspector.

Water Supply Connections

⚠CAUTION:

IMPORTANT—DO NOT apply heat to the HOT or COLD water connections. If sweat connections are used, sweat tubing to the adapter before fitting the adapter to the water connections on the water heater. Any heat applied to the water supply fittings will permanently damage the internal components of the water heater.

NOTICE:

In cold environments, ice can accumulate in the water heater's connectors. Plug in the water heater power cord for approximately 10 minutes before making these connections. This will melt any ice buildup.

Plumbing should be carried out by a qualified plumbing contractor in accordance with local codes.

Only use approved plumbing materials.

To allow the full flow capacity, it is recommended to keep water inlet and outlet pipes 3/4-in. (1.9-cm) diameter or larger.

To conserve energy and to prevent freezing, insulate both COLD and HOT water supply lines. DO NOT insulate the pressure-relief valve.