

Results of a controlled experiment: *Home Water Plant* prevention of limescale

by Sharon Laska, Principal Investigator and Scott Borough, Researcher

In December 2017, two new 7 gallon hot water tanks were set up, side-by-side, and fed moderately hard water from the city of Auburn, Washington at the headquarters of Aquametrics LLC. The two experiment set-ups were identical, except for the addition of a *Home Water Plant*[™] descaler to the cold water inlet of hot water heater number 2. Through-the-water pictures with a pipe camera were taken weekly of the supply tubes and heating elements in each of the hot water tanks. Temperature, pH, and water hardness measurements were recorded twice a week.

13 months later, on January 15, 2018 the following results were photographed:

NO DESCALER

Water Supply Tube inside Hot Water Heater # 1



A white limescale crust completely covers the water supply tube of the hot water heater without the descaler.

WITH DESCALER

Water Supply Tube inside Hot Water Heater #2



All one can see is the shiny metal surface of the water supply tube in the hot water heater with the descaler. There is no white limescale encrustation.

Results:

- After 13 months, hot water heater #1, with only moderately hard water but *no descaler*, shows limescale completely covering the water supply line
- After 13 months, hot water heater #2 with precisely the same water but *with a Home Water Plant descaler* shows no limescale.

Conclusion:

The *Home Water Plant* descaler prevented limescale formation.

The remainder of this paper details the experiment protocol, including a set-up drawing and pictures of the two tanks, and provides an abbreviated CV for Ms. Laska, the Principal investigator

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Protocol for Documenting Formation and Prevention of Limescale in Hot Water Heaters Exposed to Moderately Hard Water

Purpose of the two experiments: to document (1) the formation of limescale on a new hot water heater given moderately hard water, and (2) the prevention of limescale on a new hot water heater with *Home Water Plant* descaler treatment.

- 1) Single shots and Video of scale forming on new 7 gallon Bosch hot water heater (no descaler)
- 2) Single shots and Video of prevention of scale on a new 7 gallon Bosch hot water heater (with descaler in line).

Experiments 1 and 2 started in parallel at Aquametrics on December 5, 2017.

Two new 7 gallon Bosch hot water tanks were set up and supplied with moderately hard water from the city of Auburn at Aquametrics. For experiment 1 (with no descaler), the water runs into the hot water heater via a direct connection to plumbing in the Aquametrics building. For experiment 2 (with the descaler), the water flows into the hot water heater from a 50 gallon drum that holds identically sourced water. Water flows into and out of each hot water tank for a 1 minute interval, hourly. There is a pipe camera for each experiment. On December 5, 2017, a pipe camera was placed near the heating element near the bottom of each hot water heater. Placement of the pipe camera lens and lighting were optimized in each tank. Still pictures and video/audio were taken and saved to files in appropriate folders. In addition, video and audio were shot of each set-up using the following scripts:

“December 5, 2017. The purpose of experiment #1 is to document the formation of limescale over time in a hot water heater exposed to hard water. Equipment used includes a new Bosch 7-gallon hot water heater and a pipe camera to take still pictures and video/audio inside the tank near the heating element. 8 grain water from the city of Auburn is pumped through the hot water heater under a pressure of 60 psi, with the water flowing for 1 minute each hour. The temperature is set to 140°F.

“December 5, 2017. The purpose of experiment #2 is to document the prevention of limescale over time in a hot water heater exposed to hard water. Equipment used includes the *Home Water Plant* descaler from Aquametrics, a new Bosch 7-gallon hot water heater, and a pipe camera to take still pictures and video inside the tank near the heating element. 8 grain water from the city of Auburn is pumped through the hot water heater under a pressure of 60 psi, with the water flowing for 1 minute each hour.

The temperature is set to 140°F. The equipment in experiment #2 is as identical as possible to that in experiment #1, except for the addition of the *Home Water Plant* descaler attached to the cold water inlet of hot water heater #2.

The following measurements will be made as indicated and entered on a spreadsheet.

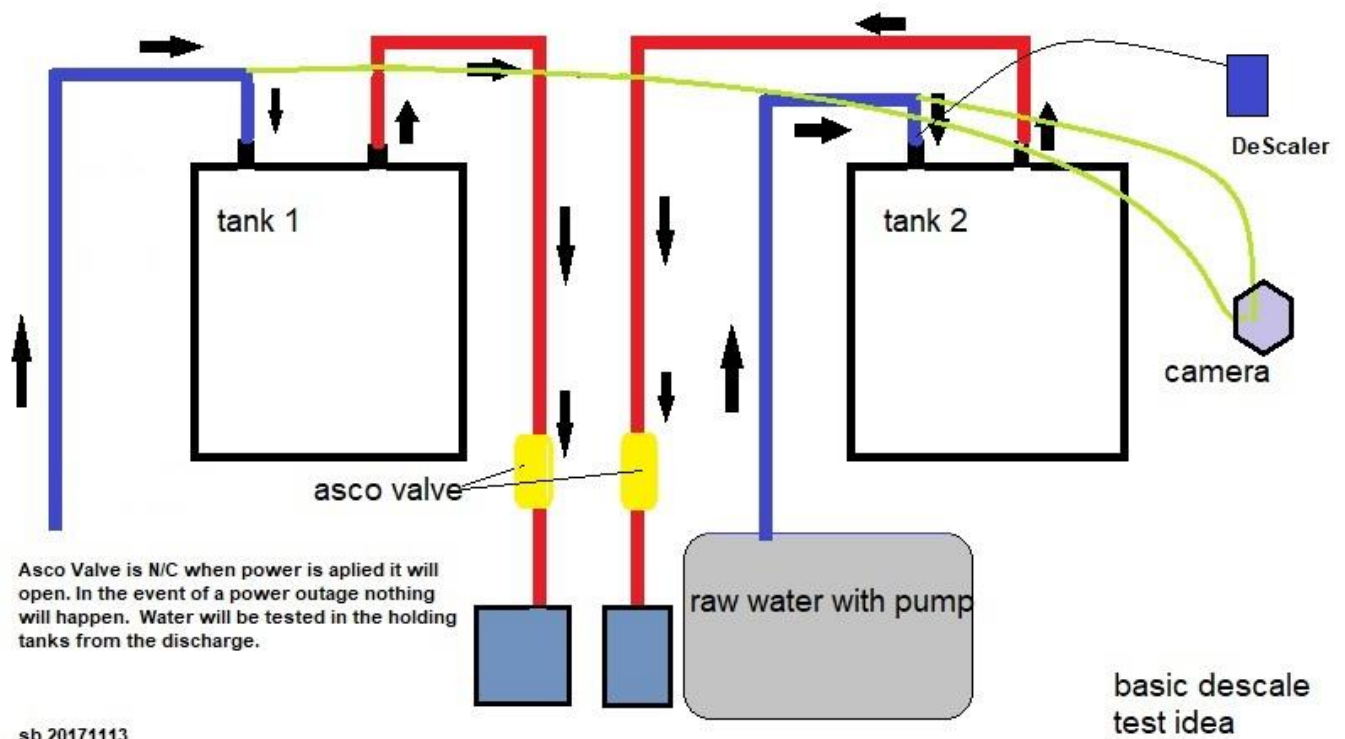
- pH of intake and outflow at start and twice a week thereafter
- Hardness of intake and outflow (in gpg) at start and twice a week thereafter
- Discharge temperature twice a week.

During the first 2 weeks, still shots and audio/video will be taken M-F, once a day, for each of experiments 1 and 2.

Following weeks — will decide how often after first two weeks.

A still shot of the descaler with working lights will be taken once a week.

Diagram of set up as of December 5, 2017.



Picture of set up as of December 5, 2017



Author:

Sharon Laska

Sequim, WA

Abbreviated Curriculum Vitae

Education:

B.S. Biochemistry, University of Wisconsin

M.S. Chemistry, University of Washington

M.B.A. City University

M.S. Education, Seattle Pacific University

Work History:

- 15 years at University of Washington in Clinical Chemistry, University Hospital.
- 5 years at the first Biotech Company in Seattle – Oncogen. Later Oncogen was purchased by Bristol-Meyers. Developed a diagnostic blood test for breast cancer.
- 4 years at Baxter Healthcare in Chicago. Developed an automated blood test for syphilis for the American Red Cross for blood banking.
- 5 years at a start-up biotech company. VP of Manufacturing and Customer Service. Responsible for all reagent manufacturing, including water quality and reagent shelf-life.
- 14 years teaching chemistry and advanced chemistry in Seattle area