# YOUR HOUSEHOLD WATER QUALITY: CORROSIVE OR SCALING WATER

## WHAT ARE CORROSION AND SCALING?

Corrosiveness or scaling is an inherent property of some groundwater and is related to the type of rocks or sediments in contact with the groundwater.
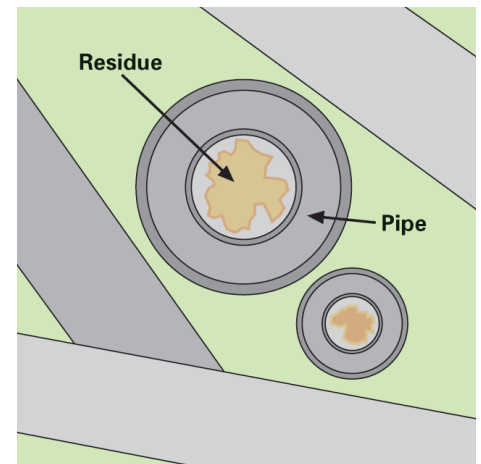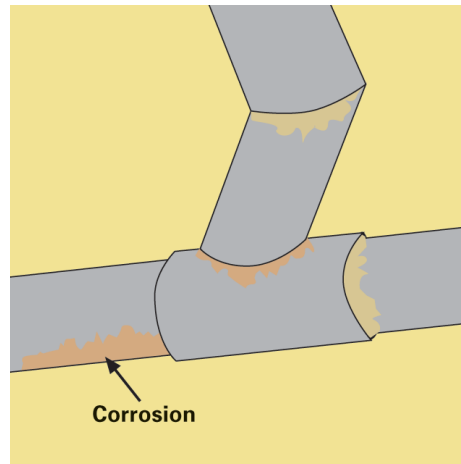


**Corrosion** is caused when water reacts with or dissolves metal plumbing. This can add toxic levels of metals like copper and lead to your water. Other problems associated with corrosive water include:

- **Deterioration and damage to the plumbing.**
- **Water damage caused by leaks.**
- **Staining of laundry.**
- **Bitter taste.**
- **Staining of plumbing fixtures.**

**Scaling** occurs when water has high levels of minerals like calcium carbonate, which can build-up on surfaces. Slight scaling can be considered beneficial in that the inside surfaces of metal pipes become coated with harmless minerals that act as a barrier to corrosion. Increased levels of scaling, however, can be harmful. Hot-water heaters are the most common place for scale formation in a home water system. Problems caused by scaling include:

- **Reduced efficiency of your hot-water heater.**
- **Reduced or blocked flow to fixtures or appliances.**
- **Leaky valves.**

The degree of either corrosiveness or scaling can be predicted using a Saturation Index (SI). The following information contains a description of the SI, strategies for reducing problems, and treatment methods to reduce the corrosion or scale caused by your water.

## WHAT IS A SATURATION INDEX (SI)?

The SI is a calculation that compares the actual pH to a theoretical pH based on physical and chemical properties of your water. The values range from negative to positive. Negative numbers indicate a potential for corrosion and positive numbers predict scale formation. Values close to zero indicate that the water is balanced and there

should not be problems from either corrosion or scaling. See the Saturation Index table below for SI values, descriptions, and general recommendations.

## WHAT CAN I DO TO REDUCE PROBLEMS FROM CORROSION WITHOUT INSTALLING A TREATMENT SYSTEM?

Using plastic pipes in the house and non-corrosive fixtures will eliminate many corrosion problems. Submersible pumps should be constructed of stainless steel. If any metal plumbing hardware is used, do not join two different metals.

## WHAT CAN I DO IF THE NON-TREATMENT STRATEGIES DON'T REDUCE CORROSIVENESS?

Raising the pH of your water will reduce its corrosiveness. A filter bed containing basic minerals of calcium or magnesium is the recommended method for raising pH. Filter beds are commercially available that contain calcite (marble chips) or a blend of calcite and magnesium oxide. Use the blend when the actual pH is below 6.0.

## WHAT CAN I DO TO REDUCE SCALE FORMATION WITHOUT INSTALLING A WATER SOFTENER?

Scale formation in the hot-water heater can be considerably reduced by lowering the temperature setting. Lower temperatures produce less scale. As an added benefit to lowering your hot-water temperature, your utility bill will be less. However, dishwashers may not clean dishes properly at temperatures below 140°F. Scale may still form in the hot water heater and accumulate over time. As scale builds up, the efficiency of this appliance will decline. Flushing out the accumulated scale on a regular schedule will restore the heat transfer efficiency.

| SATURATION INDEX (SI) TABLE | | |
|---|---|---|
| **SATURATION INDEX (SI)** | **DESCRIPTION** | **RECOMMENDATIONS** |
| -3.0 -5.0 | **Very Severe Corrosion** | **Treatment Recommended** |
| -1.0 to -3.0 | **Moderate Corrosion** | **Consider Treatment** |
| 0.0 | **Balanced** | **Treatment Not Needed** |
| 1.0 to 3.0 | **Moderate Scale** | **Consider Treatment** |
| 3.0 to 5.0 | **Very Severe Scale** | **Treatment Recommended** |

## WHAT CAN I DO IF THE NON-TREATMENT STRATEGIES DON'T SOLVE MY SCALING PROBLEMS?

The most common treatment for reducing scale formation is to "soften" the water. "Softening" is a process where calcium and magnesium in the water are exchanged with sodium. Commercial softeners are available either through a plumbing equipment supplier or a water treatment professional. Note that the amount of sodium in your water will increase, which can create problems for people on low sodium diets. Only softening the hot water, removing the sodium before drinking, or by-passing the softener for drinking water can eliminate this problem. Sodium can be removed by reverse osmosis, distillation, or ion exchange resin filtration.

The University of Georgia and Ft. Valley State University, the U.S. Department of Agriculture and counties of the state cooperating. The Cooperative Extension Service, The University of Georgia College of Agricultural and Environmental Sciences offers educational programs, assistance, and materials to all people without regard to race, color, national origin, age, sex, or disability.

An Equal Opportunity Employer/Affirmative Action Organization Committed to a Diverse Work Force