

ONLY pH?

Some GARN® WHS users are utilizing local water testing firms (or self testing) their thermal storage water. Generally, they are only checking the pH. Is *pH alone* a sufficient indicator of “water health” and corrosion protection or not?

The correct answer is no, pH alone is **NOT** a good indicator of water health; therefore it is not a good indicator of corrosion protection. Corrosion comes in many flavors (including, but not limited to):

- Under deposit corrosion – from sedimentation due to high total dissolved solids
- Bacterial corrosion – brought in with contaminated water or air
- Crevice corrosion – generally the result of non-welded water side seams
- Oxygen pitting – excess oxygen in the water from oxygen diffusion or air leaks
- Electrolysis – due to electrical faults or dissimilar metals
- Incorrect pH – low pH water attacks steel

Water can have a good pH number (8.5 or 9) and still exhibit conditions that result in one of the other types of corrosion. PH only indicates whether the water is acidic (pH<7) or basic (pH>7). *Acidic* water readily attacks steel; whereas *basic* water does not attack steel. *Therefore, testing only the pH of water misses the majority of the causes of corrosion.*

What tests constitute a sufficient chemical analysis to be fairly sure that the water in *any* hydronic heating system is “healthy” and is protecting the system? A partial list includes:

- Visual appearance – is the cloudy and is there floating debris
- Specific gravity
- pH (neat)
- Total dissolved solids
- Conductivity
- Total iron as Fe
- Hardness
- Residual chemical
- Plate count – bacteria colonies detected
- Etc

If a unit has consistently tested “good” in the past, all of the tests may not need to be required every time. However, a unit with chronic water quality issues will receive the “full test regime” every time. Testing is strongly recommended *twice per calendar year*.

Over the past several years, DECTRA has developed a very good working relationship with PrecisionChem @ precisionchem@powercom.net. Chemicals are provided with each GARN unit; and testing is automatically included at no cost for an initial period of time. However, water is not water, is not water. Groundwater in different parts of the country

can, and does, vary from benign to very aggressive. Therefore, the chemical treatment of such may vary by location.

It is always best to forward a sample of the *proposed fill water* to the chemical test lab **prior to** filling the GARN unit (or any hydronic system). In some cases, additional chemical (or even a different treatment chemical) may be required. For instance, acidic water requires *significantly* more pH buffer than basic water. Obviously, it is best to know that the fill water is very aggressive (or even *not* suitable) at the onset rather than 6 months after system start up (during which time the GARN unit, pumps, piping, etc all have been damaged).

The utilization of a pre-cleaner in any hydronic system is strongly recommended. Lubricating oils and grease are used in the manufacturing of pumps, coils, piping, GARN units, etc. Many of these oils become acidic when combined with water. Pre-cleaning removes these, as well as debris, solder flux, etc and prepares the surface of the metal to be more “receptive” of the treatment chemicals.

It is important to not connect a GARN unit to an existing system, until the existing system has been cleaned and flushed. Many conventional existing hydronic systems have *never been properly treated* and may contain a litany of “bad characters” in the system water. Indeed, the above discussion applies to all hydronic heating systems (gas, oil, electric, solar, etc), not just wood fueled systems.

This topic is so important that further in-depth information is provided in the current GARN Manuals:

- Page 15 of the Unpacking and Assembly Manual
- Pages 20 thru 24 of the Installation Manual
- Pages 25 thru 30 of the Operators Manual

So don't just test for pH and think everything is OK. Protect your system with confidence and contact **PrecisionChem** for a complete analysis and all periodic testing.