



Even the best cooling system maintenance practices will fail if the source water you're using to flush the system doesn't meet engine manufacturer and ASTM specifications. Pre-mixed coolants take much of the guesswork out using a proper source water, but when mixing your own coolant formulations or flushing your systems with water from an on-site source, analysis is highly recommended to make sure the water meets specifications.

## RECOMMENDED SCALING PROPERTY LEVELS

Scaling Properties	Definition	Specification or Recommended Levels
<b>Total Hardness</b>	The sum of calcium and magnesium in a water - hardness forms scale	170 ppm or less (ASTM)
<b>Iron</b>	Immediately forms scale providing food for iron bacteria - the biological end product of the iron bacteria food cycle being sulfur-type acids	0.5 ppm or less
<b>Silica</b>	Combines with calcium to form silicate scale - scale formed will be hard and highly insulating	30 ppm or less
<b>Sulfate</b>	Combines with calcium and magnesium to form scale or converts to sulfuric acid	100 ppm or less (ASTM)

## DEPOSIT CHARACTERISTICS

### Carbonate

A carbonate deposit is usually granular and can be very porous. The crystals of calcium carbonate are large, but will usually be matted together with finely divided particles of other materials so that the scale looks dense and uniform. A carbonate deposit can be identified by dropping it into an acid solution. Bubbles of carbon dioxide will effervesce from the scale.



**Sulfate**

A sulfate deposit is much harder and denser than a carbonate deposit because the crystal structure is smaller. A sulfate deposit is brittle, does not pulverize easily and will not effervesce when dropped into an acid solution.

**Silica**

A high silica deposit is very hard, highly insulating and resembles porcelain. The crystals of silica are extremely small, forming a very dense, impenetrable scale. This scale is very brittle, very difficult to pulverize and not soluble in hydrochloric acid.