



## **pH and Other Meaningless Terms**

In selecting materials of construction for corrosion resistant equipment; be they FRP composites, thermoplastics, stainless steels, or other alloys; it is extremely important that the chemical service environments be accurately and precisely provided. This information needs to include **all** chemicals present in the liquid or fume stream, their concentrations, and the maximum operating temperature. If upset conditions might occur, those conditions also need to be given.

Frequently, we will receive inquiries where the chemical service environment is simply given as "a pH of 3" - or, as a "weak acid solution", etc.. Often, no other listing of the actual chemicals present, and their concentrations is given.

When it comes to selecting the best and proper materials of construction for corrosive environments, the pH is a relatively meaningless terminology. For example: Vinegar has pH of 3. People drink vinegar as a tonic (i.e. honey and vinegar), wash their hair in vinegar, and use vinegar to wash windows. Sulfuric acid also has a pH of 3. You certainly would not stick your hands in sulfuric acid, drink it, or use it as a cleaning solution without wearing protective gloves. But again, both chemicals have a pH of 3.

When it comes to FRP composites, almost any resin system will handle vinegar. Yet, for sulfuric acid, a very careful selection of the resin system needs to be made, depending upon its concentration and the operating temperatures. (We have a separate technical bulletin on FRP composites and Sulfuric Acid, which is available upon request.)

Likewise, the terminology "weak acid solutions" is also meaningless when selecting corrosion resistant materials. It is extremely important to know what those acids are, and their concentrations. For example: An acid solution containing even very small amounts of hydrofluoric acid needs special FRP composite construction consideration. Likewise, there are some acids (again such as sulfuric acid) that are much more aggressive at solutions under 1% concentrations, than they are at 10%-30%. As with pH, the term "weak acid solution" provides little help to the engineer and designer of corrosion resistant FRP equipment.

Again, it is important, when you are asking us to help make a selection of the best resin system for your application, to provide a listing of all chemicals present (even those that are there in small quantities), their concentrations, and the operating temperature(s). Especially for a mixture of chemicals, if MSDS sheets are available, they can often be of help to us.