

Sulfuric vs. Hydrochloric

A system designed for sulfuric acid cannot be easily converted to use hydrochloric and vice versa. This is because of the very different ways the two acids react.

Sulfuric acid isn't nearly as corrosive to stainless steel as hydrochloric acid but gets real hot when diluted, so systems designed for HCl are generally hastelly or more likely PVC while systems for H₂SO₄ are stainless steel or perhaps CPVC.

Because HCl salts are almost all quite soluble, HCl can be used at a higher concentration, therefore flow rates are lower, H₂SO₄ salts are not very soluble therefore concentrations are lower and flow rates are much higher.

These design considerations generally preclude switching from one acid to the other once a system is built.

WHICH ACID IS BETTER?

There are obvious advantages to HCl. It is a stronger acid (virtually all the "H's" can be used where only the first H in H₂SO₄ is readily available). HCl can be used at higher concentrations than H₂SO₄ because there is far less chance of salts precipitating out in the spent acid. And diluting HCl does not produce nearly as much heat as diluting H₂SO₄.

There are also obvious disadvantages to HCl. It isn't as concentrated as H₂SO₄ so it is necessary to store a larger volume. It is far more corrosive the H₂SO₄ requiring significantly more expensive metals (namely Hastelloy C). It fumes, creating noxious corrosive odors. It is at least twice as expensive as H₂SO₄ (at least here in the USA).

Sulfuric acid is perhaps more difficult to use due to the heat of dilution and the requirement to keep concentrations low in order to minimize precipitation of sulfate salts. However it can be stored fairly easily as it doesn't fume and when concentrated is not particularly corrosive.

The USA has most of the worlds supply of elemental sulfur and therefore sulfuric acid is readily available here and significantly cheaper than hydrochloric acid. Almost all big industrial and power plant type systems in the USA use sulfuric acid. Elsewhere in the world the cost difference is less and an much higher percentage of plants use HCl.

Most of the PEDI plants use HCl because it is less risky and for them the chemical cost is small compared to transportation and other costs.

What you will find is most customers will already have their minds made up to use one acid or the other.

