PennTech Newsletter

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Quote of the Week

"If you keep your ears and eyes on your customer, you will keep your competitor's foot out of the door".... James Jones

Next Weeks Topic

* Understanding the Electropolishing Process*

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Understanding Passivation….

Passivation is the chemical treatment process by which the electrochemical condition of passivity is obtained on the surface of metal alloys. Passivity as it relates to austenitic stainless steel is the state in which chemical reactivity is minimized under special environmental conditions, such that the metal exhibits a very low corrosion rate.

Passivation Theory of Austenitic Stainless Steel

Stainless steel surfaces are rendered passive by the formation of a surface film that is a "barrier" to corrosion. This "barrier" establishes a very slow, controlled equilibrium of anion and cation diffusion across it. This passive layer consists primarily of chromium oxides, hydroxides and iron compounds, which form on the outermost surface of the metal phase. Through diffusion, the passive layer constantly "fixes" or re-passivates itself under minimum corrosion conditions. Initial passive layer establishment is achieved through chemical treatments, which remove foreign inclusions and more reactive metal ions. This treatment enhances the effective concentration of chromium, nickel and molybdenum (in the case of 316-grade stainless steel) at the surface of the metal phase. Through an unknown mechanism, these three metals together affect the creation of a more homogenous chromium oxide/ iron oxide passive layer. The uniformity and stability of the film will vary depending upon the method of treatment. Passive layer thickness and stability is critical to system longevity and product purity.

Photo of a typical passivation tank

Passivation Simplified - The stainless steel parts are deposited in a specially designed passivation tank. The process is designed to remove exogenous iron or iron compounds from the surface of the stainless steel using nitric/;citric acid at 25% concentration in a 135° F (57° C) heated immersion. After a preset soak time, the parts are rinsed in water.

How Passivation Relates to PennTech Vial Washers

All AISI-316 stainless steel parts and piping are at a minimum passivated (using the citric acid passivation method). Often these parts are electropolished which by default also passivates. Passivation is performed only by certified operators. Every part that is passivated receives it's own Certificate of Passivation

Electropolishing discussed in next week's newsletter.

PennTech Machinery Corporation