

The Electropolishing Process

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Electro polishing also called chemical polishing or known in the industry as ECP. Electropolishing is an electrolytic process for de-burring, polishing, passivating, brightening and removing contaminants on stainless steel. In the Electro polishing process, the part is submerged in a special acidic electrolyte and given a positive charge (+). Then a negative (-) piece of metal is placed in the electrolyte. A modification of surface chemistry occurs which improves the surface profile and Improves the chromium oxide ratio on the surface. This enhances the corrosion attributes of the stainless steel surface. It is advantages to have an improved surface roughness profile thus eliminating any potential crevices where corrosion may begin. So in summary; the electropolishing process improves the surface profile (Ra) and brightens the part, both attributes contribute to the reduction of corrosion being initiated. An electro polished part is relatively free of hydrogen after processing thus inhibiting micro-bacterial growth

Electropolishing is the process of choice for the Pharmaceutical, Medical, Food and Beverage, Aerospace, Dairy and many other Industries; it yields an excellent reflective cosmetic finish void of large crevices due to it's leveling effects, and a hydrogen free part, thus yielding a cosmetic finish with functional attributes. Electropolishing is the purest form of "Passivation" known today for use on Stainless Steel products.

The surface roughness of electro-polished stainless steel is as low as 0.2 to 0.3 μm .

Cost of processing:

Several factors come into the cost equation; surface area of part, current density, cycle time, Ra required. Since Electro-polishing yields a functional and a cosmetic finish, the process is regarded as a very economical process compared to electroplating processes.

Note:

Other alloys that can be Electro-polished are copper alloys, aluminum alloys, and some exotic alloys like nitinol. The chemistry is formulated for the specific alloy to be processed.

Contact Elite Metal Finishing Services, Inc. for more specific information at 262-947-0738

Reference:

ASTM Standard B912-00, "Standard Specification for Passivation of Stainless Steels Using Electropolishing," ASTM International, West Conshohocken, PA, www.astm.org.