

# Improving Material Properties Through Electropolishing

## An Introduction to Electropolishing

Electropolishing is an electrochemical process by which surface material is removed by anodic dissolution. What may be envisioned as “reverse plating”, electropolishing actually removes surface material, beginning with the high points within the microscopic surface texture. By removing these points, the electropolishing process will improve the surface finish, and enhance the near surface chemistry of the material.

## Improving Corrosion Resistance & Reducing Product Adhesion

Electropolishing delivers a smoother, more reflective surface that reduces product adhesion and improves surface cleanability. Perhaps more importantly, electropolishing preferentially dissolves free iron, inclusions, and embedded particles from the surface of the work-piece. This process improves the near surface chemistry of the material, and promotes the formation of an improved corrosion resistant oxide layer.

Please see the full description of each of electropolishing's benefits.

## The Basics of Electropolishing

Electropolishing is accomplished by creating an electrochemical cell in which the material to be polished is the anode. A cathode is formed to mirror the geometry of the work-surface and the two are submerged in a electrolyte bath. When a DC current is applied, the electrical charge forces metal ions to be dissolved from the materials surface.

The key to the electropolishing process is the difference in current density across the surface. Within the microscopic surface profile, the current density is greater at the high points and lesser at the low points. The rate of the electropolishing reaction is directly proportional to the current density. The increased current density at the raised points forces the metal to dissolve faster at these points and thus tends to level the surface material.

## Electropolishing Services

Harrison Electropolishing, L.P. specializes in electropolishing, precision mechanical polishing, passivation, oxygen cleaning, and chemical cleaning of high purity and corrosion resistant processing equipment.

Our services can be provided at our Houston facility or at your jobsite, anywhere in the world. We offer full technical evaluation, quotations, sales, and consulting services with quality assurance and test certifications.



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13002 Brittmoore Park Drive  
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