

PASSIVATION VS. ELECTROPOLISHING

Embedded contaminants. Surface defects. Oxide scale. Imperfections like these threaten the life of any part, and while the right finishing operation can reduce or eliminate their effects, how do you choose?

Passivation and electropolishing are two widely used finishing operations that many industries specify for their metal parts. While they're both chemical processes, they're significantly different from one another. Ready to find out how?

Passivation is a chemical process designed to increase the corrosion resistance of stainless steel parts.

CORROSION RESISTANCE

Electropolishing is an electrochemical process that provides a variety of benefits, including deburring, microfinish improvement, and improved corrosion resistance by eliminating embedded contaminants and surface imperfections.

Parts are placed in a basket and submerged in a nitric or citric acid bath. Depending on the stainless steel alloy, the acid concentration, temperature and time are set to effectively remove free iron and other foreign materials on the part's surface introduced during machining, stamping, etc.

The passivation leaves the part clean and more corrosion resistant but does not change the aesthetics of the part.

A part is submerged in a chemical bath and treated with electricity, making it shed a uniform layer of surface material. This strips away contaminants and burrs while smoothing out imperfections like microscopic cracks and jagged edges.

The part is left visibly bright and shiny, and it retains these characteristics even in highly corrosive environments.

You know what the processes are.

BUT HOW DO THEY COMPARE TO EACH OTHER?

Requires pre-cleaning operation

PASSIVATION / ELECTROPOLISHING

Passivation alone is not always effective at removing surface contaminants, and frequently requires an additional pre-cleaning step.

In most instances electropolishing removes all traces of surface and embedded contaminants in one operation.

Removes surface contaminants

PASSIVATION / ELECTROPOLISHING

Brightens and polishes

PASSIVATION / ELECTROPOLISHING

Effective on all grades of stainless steel

PASSIVATION / ELECTROPOLISHING

Not recommended for certain free-machining alloys.

Removes heat tint and oxide scale

PASSIVATION / ELECTROPOLISHING

Deburring

PASSIVATION / ELECTROPOLISHING

Microfinish Improvement

PASSIVATION / ELECTROPOLISHING

Improves corrosion resistance

PASSIVATION / ELECTROPOLISHING x30

30 times greater corrosion resistance than passivation

Passivation and electropolishing are both methods for increasing corrosion resistance. But the similarities end there.

As a more aggressive and comprehensive operation with longer-lasting benefits, electropolishing is increasingly replacing passivation, especially in industries that depend on its unique advantages.

Advantage:

ELECTROPOLISHING