ELECTROPOLISHING PREPARES/PRE-CLEANS PARTS PROPERLY PRIOR TO PENETRANT TESTING

It is common, especially in the aerospace industry, for parts that are fracture critical to be Liquid Penetrant Inspected (LPI) prior to installation. Also known as Dye Penetrant Inspection (DPI) or simply Penetrant Testing (PT), this method is used to detect micro-cracks or other defects that could serve as an initiation site for failure. In order to properly execute a penetrant test, the surface of a metal part must be thoroughly clean of any debris, smeared metal, or any amorphous layer that may be hiding a hairline crack thus yielding a false reading.

WHY IS ELECTROPOLISHING BENEFICIAL?

Electropolishing is the ideal process for this essential pre-clean step because it can be easily controlled to remove a precise amount of material in order to achieve the goal of eliminating displaced metal and exposing the true surface. Other types of chemical etching baths that do not involve electrical current are harder to control. As the bath heats up the chemicals can become more aggressive and the material removal rate may vary and be harder to keep under control. Parts with close tolerances can be easily turned to scrap with an etching procedure. Electropolishing uses an electrolytic solution in combination with rectified current. As soon as the current is turned off there is no more electropolishing action/material removal taking place, even while the parts are still within the electrolytic bath. With these controls, electropolished parts can be expected to have a tolerance of +/- .0002" stock removal from part to part or lot to lot. For example, if the aim is to remove .0006" total off of a given diameter or thickness, the range of total stock removal expected over the course of the production run should never vary outside of .0004" - .0008". Electropolishing is also superior to chemical etching in that some material alloys do not respond favorably to chemical etching. It has been reported that A286 material, for example, was completely destroyed by a chemical etch bath which had worked fine on other materials. Volume 2 of the Liquid Penetrant Testing Non-Destructive Testing Handbook states also that "abrasive cleaning methods should be avoided" as these methods smear the metal and close discontinuities that the penetrant test would have detected.

WORKING WITH ABLE ELECTROPOLISHING

Able Electropolishing has worked with many customers who desire to prepare their parts properly for penetrant testing. Most often these parts are flight critical and fracture critical and must endure the most stringent tests before they are integrated into anything from a commercial flight vehicle to a space flight system. Able has the capability to work with all shapes and sizes of parts as well as various materials including all types of stainless steels, A286, titanium, aluminum, Monel and Inconel alloys, and much more. Electropolishing can be used to clean the inside of tubes/I.D. surfaces down to ¼" diameter in size. Able works with customers to hone in on critical surfaces, remove proper amounts of material, and has an industry leading quality system in place to match that of aerospace companies and their suppliers.

ableelectropolishing.com
sales@ableelectropolishing.com
888.868.2900

ABLE® Electropolishing
Advanced Metal Improvement Technologies

ELECTROPOLISHING PREPARES/PRE-CLEANS PARTS PROPERLY PRIOR TO PENETRANT TESTING

BENEFITS OF ELECTROPOLISHING

Able Electropolishing's advanced metal finishing capabilities offer a variety of benefits including:

// CORROSION RESISTANCE

Over time, untreated metal parts can develop corrosion. Electropolishing can create a smooth surface that eliminates initiation sites where corrosion can develop on metal parts.

// ULTRACLEANING

When metal parts need to be free of surface contaminants and debris, electropolishing is the ideal solution. Electropolished parts are passive and free of foreign materials—which is necessary for many applications.

// DEBURRING

Burrs on parts left untreated can become dislodged and create problems in everything from fuel systems to hydraulics. Removing microburrs improves part performance.

// FATIGUE LIFE IMPROVEMENT

Micro-cracks and defects left on parts can become initiation sites for cracks that can lead to premature part failure. By removing imperfections from the surface, electropolishing improves the life of components.

// MICROFINISH IMPROVEMENT

While not visible to the human eye, untreated metal parts could have micro imperfections, like cracks and defects that could potentially compromise their safety and longevity.

OTHER SERVICES WE PROVIDE

Full metal finishing services and finish enhancement for nearly any alloy.

// ELECTROPOLISHING

// PASSIVATION

// TITANIUM COLOR ANODIZING

// LASER MARKING

// CONTRACT CLEANING

// BAKE OUT

For further information on all our metal finishing services, contact a sales engineer or visit our website.

ABOUT ABLE

A pioneer in electropolishing and metal improvement technologies, Able Electropolishing has become America's largest electropolishing specialist, employing more than 180 people on three shifts at our 40,000 sq. ft., state-of-the-art facility in Chicago, IL. Thousands of companies in nearly every industry worldwide utilize Able technology for their metal parts.

ableelectropolishing.com
sales@ableelectropolishing.com
888.868.2900

ABLE® Electropolishing
Advanced Metal Improvement Technologies