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Technical Summary

Commercial applications for electropolishing have been in use since the early 1950’s. Most formal research on the process occurred at that time, motivated by the growth and sophistication in electroplating technology. Today there are about 500 industrial installations nationwide, and perhaps several dozen electropolishing job shops.

Electropolishing is often referred to as a “reverse plating” process. Electrochemical in nature, electropolishing uses a combination of rectified current and a blended chemical electrolyte bath to remove flaws from the surface of a metal part.

The typical electropolishing installation is deceptively similar to a plating line. A power source converts AC current to DC at low voltages. A tank typically fabricated from steel and rubber-lined is used to hold the chemical bath. A series of copper or stainless steel cathode plates are lowered into the bath and installed to the negative (-) side of the power source. A part or group of parts is fixtured to a rack made of titanium, copper or bronze. That rack in turn is fixtured to the positive (+) side of the power source.

As the adjoining illustration depicts, the metal part is charged positive (anodic) and immersed into the chemical bath. When current is applied, the electrolyte acts as a conductor to allow metal ions to be removed from the part. While the ions are drawn toward the cathode, the electrolyte maintains the dissolved metals in solution. Gassing in the form of oxygen occurs at the metal surface, furthering the cleansing process.

Once the process is completed, the part is run through a series of cleaning and drying steps to remove clinging electrolyte. The resultant surface is clean and bright. In fact, the bright surface is the most identifiable trait... the one that helped coin the process name: Electropolishing.

While the process is best known for the bright polish left on a surface, there are some important, often overlooked benefits of this metal removal method. These benefits include deburring, size control, microfinish improvement and others. These metal improvement benefits offer great promise to design and production engineers for cost savings and product improvement.

Although the process was developed in the 1950’s, substantial refinements have taken place. Many electrolytes have been developed to allow for electropolishing of a broad range of metals. These newer electrolytes, together with advanced parts handling techniques have combined to improve production yields on a wide range of metal products.

Alloys We Electropolish:
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- Precipitating Hardening Grades
- Copper Alloys
- Specialty Alloys
- Nickel Alloys
- Unusual Stainless Steels
- Carbon Steels
- Tool Steels
- Specialty Steels
- Aluminum
- Titanium
- Nitinol

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The electropolishing process is well-suited for deburring. During the process, the transfer of metal ions occurs most rapidly on corners or edges of metal parts. Current density or concentration of electro-chemical power is greatest at high points, just as lightning is drawn to tall trees and buildings. This helps explain why plating builds metal faster on an edge or burr, while electropolishing (the “reverse” of plating) removes metal fastest at these points.

Properly controlled, the process can remove burrs from incredibly complex or fragile parts that do not lend themselves to conventional tumbling or vibratory finishing techniques. The process is best suited for parts having fine blanking, milling, broaching, lapping or grinding burrs. Since electropolishing is non-mechanical, it is important to note that the hardness of a metal part has no bearing on the burr removal. The process works equally well on a fully annealed or hardened part. This is one reason why electropolishing is often specified as a final deburring and finishing process after all fabrication and heat treating processes.

The fact that electropolishing is a non-distorting process is often overlooked. Many metal parts produced today have critical microfinishes or are made from lighter, more fragile materials. In those cases, mass finishing techniques such as tumbling or vibra-finishing create distortion or warping, and can nick or scratch fine finishes. Electropolished parts are never subjected to stress from polishing media nor are they impinged or tumbled onto each other.

It’s important to note that burr removal is limited based on burr size and component configuration. Larger burrs produced in rough milling or displaced metal from drilling operations often need pre-treatment using other methods. Also, heavy die break burrs caused by improper tooling maintenance are difficult to remove with electropolishing alone.

The 400 series stainless steel component pictured is the inner portion of a dual drill bit assembly used for surgery on the human brain. Grinding and/or machining burrs prevent the mating parts from freely rotating (one bit within the other), while burrs specifically on cutting edges reduce ease and rate of cutting. Increased pressure on the drill bit due to "as-machined" cutting edges affects the functionality of the cutting device’s clutching mechanism. The sharpness of the bit is tied directly to the function of the rest of the device. In addition, if not properly removed, burrs may flake or chip off causing a potential bio-hazard for the patient.

By precisely removing .0005” +/- .0001” total material off of the drill bit O.D., electropolishing preserves edge condition while removing problematic burrs. As in this application, electropolishing is often a superior alternative to hand deburring. The electropolishing process offers greater consistency from part to part or lot to lot and is significantly more cost effective. In eliminating burrs while maintaining sharp cutting edges, electropolishing allows the cutting device to function smoothly, efficiently and safely.
Case Study 2

The part pictured is a 420 stainless blade used on high-end vegetable peelers. After the grinding operation, the blade edges are left sharp, but ragged. Pictured parts below illustrate the burrs post-grinding. The grinding burrs need to be removed in order for the blade to slide and cut smoothly. It is also important for this product to be clean and free of any metal shavings as it comes into direct contact with food. After researching various deburring options, the manufacturer of this high volume product found electropolishing to be the most consistent and cost effective method to finish the blade component of the peeler. As the final operation, electropolishing serves to both deburr and clean the part. In this case, .002” total material is removed from the thickness of the blade which, after extensive sampling, was proven to be the optimal amount of removal. Once electropolished, the blades are burr-free and sharper than in the “as-ground” condition.

A Commitment to the Environment

Able continues to make large investments in our facility to make sure we are in compliance with the stringent environmental guidelines now being enforced by federal, state and local regulatory agencies. This investment means we’re ready to serve our customers today and in the future.

Inside the plant, the waste treatment equipment occupies approximately 4,500 square feet. Our proprietary environmental waste management system separates the waste from the unique mixture of base metals used in the alloying of material that is electropolished. Able’s treatment of this mixture includes chemical reduction, waste stream blending, coagulation, flocculation, pH adjustment, settling microfiltration, ion exchange and dewatering. The result: total separation of the water from the waste material. At that point, the waste material is dried, formed into compact "cakes", and collected in a special bin for disposal.

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Microfinishing

In assemblies where contact to metal surfaces is critical, improvement of that metal surface becomes important. Virtually all metalworking operations including cutting, stamping, welding and forming roughen a metal surface. When that metal surface is then forced to work in critical sealing or friction zones, product performance often suffers.

One of the traditional instruments used to measure surface roughness is the profilometer. The profilometer, using a diamond stylus to record the irregularities of the surface, usually gives a readout in microinches or micrometers. This quantifies the roughness of the surface with a larger number indicating a rougher surface. Electropolishing typically reduces these microinch values by 50%, i.e. a 16 microinch surface before electropolishing will be improved to an 8 microinch afterward.

Illustration A depicts a typical cross-sectioned metal surface. The electropolishing process allows for a concentration of current in the peaks of a surface, thereby reducing microscopic peaks and causing a leveling action. By reducing the surface peaks, the microfinish values are reduced as well.

In general terms, electropolishing when properly applied can reduce microfinish values by 50% with a removal of .0005” from each surface. Chart B (facing page) clearly shows that maximum benefit is achieved in this area, and that removing much more metal does not continue to improve surface finish.

It is important to note that electropolishing is best suited for improving microfinish values on complex or fragile parts. Many other microfinish improvement methods such as grinding, lapping or harperizing are not suitable on multi-faceted parts or fragile stampings.

Case Study 1

Many medical components are electropolished for improvement of surface finish. The parts below are made from 410 stainless steel, and heat treated for hardness. The cutting teeth are ground. The part required both an improvement in the micro-finish as well as a general cleaning to remove heat treat discoloration and light scale.

These photos show the ground cutting teeth looking downward. At 45X magnification, the grinding marks and some clinging debris are clearly evident. With .0007” of material removal, the majority of the grinding marks are “blended”, while retaining a great portion of the cutting edge.

At 300X, the ground edge is further magnified to show the grinding marks and hanging burrs. The finish is approximately 16 microinch. After electropolishing, the grinding marks are reduced substantially, though still evident. Note that metal removal was better concentrated on the leading edge, completely removing the burrs and providing a smoother surface. Though difficult to measure, the finish is approximately 8 microinch. The final finish was clean, free of chemicals, scale and oxides.
Case Study 2

Based on the nature of the process, Electropolishing lends itself to improving microfinish on all facets of a part. Electropolishing works especially well in the case of intricate or delicate parts where mechanical polishing or vibratory finishing would not be a viable option. In the case of the part pictured, a rather delicate, Electrical Discharge Machined part made from 301 SS, an engineer needed to find a way to remove the recast layer and improve microfinish. This part is used to make electrical contact to a metalized pad on a ceramic substrate. The Electrical Discharge Machined surface is rough and can cause damage to the pad and/or the ceramic itself during installation. A rougher surface can also result in arcing and an overall poor connection. By Electropolishing and consequently removing approximately .0005" total material from the thickness of the part, the recast layer was removed and the part exhibited a smoother finish more suitable for the application.

Try Electropolishing on Your Part for FREE

Will our process lower your production costs and/or improve quality? You'll never know unless you try, and we make experimentation easy on you and your budget.


2. Send us your sample part. Include details on the alloy and problem you are encountering. Include a drawing if available.

3. No Charge We will electropolish your sample part (usually in 48 hours) and rush it back to you for your testing and evaluation.

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An electropolished part has the following characteristics:

**Non-coating**
Unlike paints, plating or teflon coatings, an electropolished surface does not peel or abrade. This is especially important where particles from coating abrasion can cause equipment malfunction or other hazards. Typical areas include food or pharmaceutical processing, high vacuum assemblies, pure gas/water systems and critical switch assemblies.

**Non-Distorting**
An electropolished finish can be uniformly applied on complex or fragile parts that do not lend themselves to other finishing methods. There is no effect on surface hardness and no stresses are introduced to the part.

**Stain/Corrosion Resistant**
Since electropolishing removes imbedded impurities and smooths a metal surface, the resulting finish is more resistant to corrosion, tarnish or oxidation. These properties are especially evident on stainless steel, but also found on carbon steel, brass, aluminum and copper. While all these alloys are more resistant, we do not routinely recommend electropolishing as a substitute for coatings designed to protect a metal part in harsh environments.

**Improved Weldability**
In critical spot weldments, electropolished components are more conductive. The improved conductivity allows better, stronger welds at lower voltage. In other welding or brazing operations, electropolished surfaces generally weld more readily with less weld splatter and surface damage.

**Bright Finish**
Perhaps the best known application for electropolishing is in the area of decorative finishing. While the bright finish is the trademark of electropolishing, the key benefits of the surface cleansing are much more than "good looks". Since the process removes surface metal, virtually all surface impurities are removed as well. Imbedded scale, rust, foreign debris, oils, grinding compounds and other materials are removed as the base material is dissolved. While the resultant surface is not technically "pure" it is left at or near original mill specifications, ready for final assembly or plating.

Machining and thread rolling can be dirty processes. Often these processes embed cutting fluid and shop dust into a part. In the case of the Titanium (Ti-6AL-4V) parts pictured above, friction and heat from the thread rolling operation is causing a black discoloration to form on the threads. The client had tried multiple solvents and solutions in ultrasonic cleaning tanks to remove the black, amorphous layer created by thread rolling, however, none of these attempts to clean the part worked. The part is used in a medical application and would not be acceptable in the "as-thread-rolled" condition. Besides not "looking saleable", the parts could potentially corrode prematurely due to embedded contamination from tooling and the dirty surface is more likely to harbor bacteria than a clean, smooth surface. Before moving forward with the final machining operation to finish the part, the client needed an economical and consistent way of removing the discoloration and contamination in the threads.

**The Solution:**
We electropolished samples with the minimum amount of material removal required in order to clean and passivate the part. By removing approximately .0005" total material from diameter (.00025" per surface), we were able to provide a consistent finish that would be acceptable for a part used in a medical/surgical setting. In addition to cleaning the threads, electropolishing often reduces the coefficient of friction creating a better finish on the thread which may reduce galling and provide a better functioning finished part.
Case Study 2

This part is fabricated from a beryllium/nickel alloy, used in a switch application. The ribs are cut by wire EDM, formed to shape, followed by heat treat. The customer was looking to remove surface and imbedded contamination from both the EDM process and subsequent handling.

Under 100X and then 500X magnification, the delicate ribs show obvious contamination, burrs, and recast materials on all sides and edges. Because of the soft alloy and very critical shaping, this part did not lend itself to any mechanical cleaning for fear of warping or distortion. Additionally, critical dimensions eliminated the possibility of chemical etching, which often has widely varying stock removals.

By carefully controlling material removal, all critical surfaces were completely cleaned of surface and sub-surface contamination. The amorphous layer was removed as well, exposing the true base metal. In this and similar cases, electropolished parts will pass strict clean room standards. Additionally, in high stress/high cycle switch applications, the removal of stress cracks extends product life.

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Electroplishing is widely specified to enhance corrosion resistance on a wide variety of metal alloys. Although most commonly used on stainless steels, electropolishing offers corrosion resistance on other alloys as well. Due to the versatility and superior effectiveness, electropolishing is fast becoming a replacement process for passivation.

Passivation is a chemical process that has been used for years to help restore contaminated stainless steel to original corrosion specifications. Passivation is routinely specified by engineers because of the many sources of contamination. The intent of passivation is to remove free iron or other foreign matter from the surface of the metal and to create a chromium rich surface that is resistant to corrosion. However, passivation is generally not effective in removing imbedded free iron and contaminants and will not remove heat tint or oxide scale on stainless steel.

Engineers looking to pass stringent salt spray and humidity tests have turned to electropolishing for a more aggressive replacement for passivation. The electropolishing process dissolves the outer skin of metal, removing deeply imbedded contamination. Heavily contaminated surfaces such as machined parts, welded or brazed assemblies or other components that typically respond poorly to passivation alone, are good candidates for electropolishing. Unlike passivation, all stainless alloys including the 400 series and precipitating grades can be processed without distortion, flash attack or hydrogen embrittlement.

Just as electropolishing is used to enhance corrosion resistance on stainless steel, it offers corrosion resistance on other alloys as well. Many companies use the process to delay or retard the corrosion properties of copper, brass, aluminum and carbon steels. On these and other alloys, the removal of surface skin and impurities enhances the corrosion resistant properties of the component.

The parts pictured on the right are made from type 303 stainless steel. After a series of machining operations, the parts needed to be decontaminated to remove imbedded steel and other impurities.

Under 40X magnification using the scanning electron microscope, you can see the passivated part is actually rougher, due to the chemical attack of the 303 stainless steel by normal passivation. In contrast, the electropolished part is smooth and clean. By carefully monitoring the amount and rate of metal removal, electropolishing dissolves the surface skin and its impurities, including impinged steel flecks and other contaminants.
To portray the benefits of passivation versus electropolishing, we subjected two sets of parts to the ASTM B-117 salt spray test at an independent testing facility. The test parts included a formed Auger made from 430 stainless steel and a Wire Weldment fabricated from 304 stainless steel. The testing was performed on each part in the raw, passivated and electropolished state.

The pictures (below on the right) show the Auger after 144 hours of exposure in the salt spray cabinet. As you can see, after 144 hours of exposure, the raw and passivated parts show advanced red corrosion on the extremities and in the hole. The electropolished part exhibits light red corrosion at the extremities and shows the superior corrosion resistance gained with the use of Able’s electropolishing process.

After 72 hours of exposure to the salt spray, the raw and passivated Wire Weldment parts (below on the left) developed red corrosion in the resistance welded areas. The electropolished part showed no visible corrosion after 144 hours of testing.

Electropolishing is effective in treating the carbide precipitation condition that occurs in the heat affected zone during welding. It also improves the chrome to iron ratio on the surface which greatly improves the corrosion resistance.

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- Medical Cutting Instruments
- Food Processing Blades
- Beryllium Copper Switches
- Hard Disk Drive Components
- Specialty Sanitary Fittings
- Gears, Splines and Shafts
- Paper Feed Components
- Automotive Trim
- Fuel Injector Nozzles
- Ball Valves
- Precision Dental Instruments
Electropolishing has become a common metal finishing process used to help improve the life of metal parts that flex, cycle, twist, and bend. These components come in many forms including stampings, wire forms, laser cut tubes and even machined parts. During the manufacturing process micro defects on the surface of these components are left behind. These defects, often in the form of micro-cracks or pits, can become initiation sites for crack propagation or corrosion.

By removing these imperfections on the surface of metal parts, engineers have found electropolishing to greatly improve the life of components that function as springs.

The figure above shows how a small crack or notch can create a condition that will result in failure as stresses are placed along the surface of a part. This “notch effect” can be mitigated by removing a small amount of material from the surface of the metal part, restoring its surface to a smooth, defect-free surface. Able electropolishes millions of springs each year made from music wire, stainless steel, and Nitinol to improve their performance.

Case Study 1

Over the years, Able has electropolished many stamped parts that are designed to flex and torque repeatedly during use. The electropolishing has proved beneficial in extending the life of parts that would otherwise not meet demanding cycle life specifications.

One of our customers was experiencing a problem with a part failing prematurely in a flight critical rotorcraft application. The part was stamped out of heavy gage material and the elliptical areas at the end of their narrow slots were developing fissures and cracks after stamping. After extensive testing, they determined that these defects were the root cause for the parts not reaching their desired stress requirements.

Able worked with the customer in electropolishing a number of test lots to determine the proper material removal and processing parameters. In the end, Able was successful in removing the fissures and cracks enabling the part to pass the stringent bench testing. The electropolishing success was an important factor in the company being awarded a large contract for its new part design. The ability of the part to function longer without wear, greatly improved the length of time the rotorcraft was able to remain in operation.
Case Study 2

One engineer’s comment about the results of Electropolishing was “Phenomenal”. In this case a 17-7 PH stainless steel extension spring was failing and causing a constant maintenance problem. The engineer ran samples of their extension spring with different levels of material removal. The engineer had the electropolished extension springs cycle life tested. The results of the cycle life test increased well beyond current cycle levels and eliminated costly maintenance. The engineer added Electropolishing to the extension spring specification.

Case Study 3

An automotive industry application had 17-7 PH stainless steel wire forms that were not meeting the intended fatigue life cycle under high and low psi. The engineers decided to try Electropolishing wire form parts to hold high and low psi in all areas of compression in the engine without stressing. Electropolishing removed the micro surface cracks. The surface was significantly improved. The wire forms tested were successfully fatigue tested well over 900,000 cycles. Electropolishing was added to the final design.

A Range of Services

Electropolishing:
Our proprietary reverse plating technique offers solutions to a wide variety of metal surface problems. Brighten, deburr, size and passivate your parts all in one operation.

Color Anodizing:
Color anodizing of titanium to allow easy identification through color coding.

Passivation:
ABLE passivates per the ASTM A967 specification, as well as many other industry and customer-specific standards.

Contract Cleaning:
Able provides contract cleaning services on metal parts from vapor degreasing to complex customer specific cleaning specifications.
Sizing

In the past several years, advancements have been made in electropolishing technology that has allowed metal removal to be controlled to within .0001". This control over stock removal together with the ability of the process to work on complex geometries has opened new applications in part sizing. On complex or fragile components where final sizing is difficult or expensive, electropolishing can be an economical procedure. Sizing can be of special importance in the following areas:

**Scrap Recovery**
Parts made oversize by operator or machine error, growth from heat treating or other unexpected cause can be brought to finished size with electropolishing. While secondary grinding, lapping or other processes are often used to reduce an oversized part, most of these processes are useless once a part is in finished form or already hardened. Sizing can be performed regardless of hardness and the process will preserve most part geometries. Bores or holes can be enlarged while simultaneously reducing thicknesses on other surfaces or journals.

**Production Sizing**
Many fragile stampings or machined parts do not fit into traditional sizing operations because of the potential of damage, special tooling or introduction of surface stresses or contaminants. Parts requiring critical final sizing that do not fit well under these circumstances are excellent candidates for electropolishing. In addition, short lots or prototype runs are often sized economically as compared to secondary machining or grinding operations where long lead times or high set-up costs are a concern.

**Material Reduction**
High tolerance stampings or blankings made from specially ordered raw material should be considered. In these cases, the extraordinary costs and lead times in getting special thickness material can be avoided by ordering standard gauge material slightly thicker than final requirements. The parts can be blanked or formed as normal, and electropolished to final thickness. The reduced material costs and delivery times of the standard material often more than cover the cost of the electropolishing operation.

**Special Machining**
Parts requiring unique or special tapering, precise weight control or simultaneous deburring and sizing are often electropolished. The process is well-suited for bringing special “matched set” components to specific size or weight often at less cost than other traditional metal removal processes.

Case Study

**PROBLEM:**
The customer manufactures a close tolerance stamping out of titanium but the material thickness that is needed is not readily available.

**SOLUTION:**
Coupons are sent in at the available thickness and electropolished to the desired tolerances. The customer is then able to stamp the parts to the print specifications. The customer saves time and money by avoiding special orders for material.

End view at 75X of a surgical tube. Parts were previously made from special-order .0235 walled 304 stainless steel. This material was expensive and hard to get plus burrs produced by cutting added to the problems of maintaining sizing. The tubes were made from standard .025 material and .0015" was removed. This provided final sizing of the tube wall, and at the same time removed all burrs and foreign debris leaving tubes ready for clean-room purifying and assembly.
At Able Electropolishing, we take pride in a job well done. That includes adhering to international standards of excellence, ensuring that we consistently provide a variety of high quality metal finishing services.

We meet standards set by:
- ASTM (Formerly The American Society for Testing and Materials)
- ASME (Formerly The American Society of Mechanical Engineers)
- SAE (Formerly The Society of Automotive Engineers)
- ISO (The International Organization for Standardization)

By meeting or exceeding the various standards set by these organizations, we can provide services like electropolishing, passivation and more while giving our clients a sense of true security in our quality. When you work with Able Electropolishing, you can enjoy the peace of mind that we are meeting high standards, whether you’re sending us one part or thousands.

These are the standards we meet:
- AMS 2700
- ASME BPE
- ASTM A380
- ASTM A967
- ASTM B912
- ASTM F86
- ISO 15730

These standards allow us to provide finishing services for critical parts in industries like pharmaceutical, medical device manufacturing, aerospace and automotive engineering, appliance and more. For more information about these standards and our own practices for electropolishing and more, please contact our sales department at sales@ableep.com or call us at 773-277-1600.

Our color anodizing generates an array of colors without adding dyes or other foreign material to the titanium alloy. The color anodizing process is used not only as a decorative finish, but also as a means of color coding for product or size identification. We are capable of processing both small and large parts. From dental tips to bike frames, Able provides its services to a variety of industries.

Are you interested in seeing how your part would look after color anodizing? Able processes most samples at no charge and will send them back to you in just a few days. For information regarding sample processing or to receive a quotation, please contact our sales department by calling 888-868-2900 or e-mail sales@ableep.com.
Laser Marking

Laser marking is a fast, economical, and reliable way to identify components made of stainless steel, titanium, Nitinol, anodized aluminum as well as many plastics.

Able has recently purchased a Trumpf TruMark Laser Marking System to complement its suite of services that it offers to manufacturers of metal components for virtually any industry. Customers that currently use Able for electropolishing can now find one-stop-shopping for parts that require electropolishing, laser marking, and a subsequent passivation operation.

With X, Y, and Z stages as well as rotary indexers, Able has the ability to mark flat and 3-dimensional components up to 18.7” high as well as cylindrical products with alphanumeric characters in any font.

Able can mark any logo, shape or other form of identification including 17 most common barcodes including Code 39, Interleaved 2 of 5, EAN, Code 128A, CODABAR

Able can mark 5 different 2D matrix formats: all data matrix symbols including ECC200 (square and rectangular), dot code, PDF 417, and QR. Fully UID compliant.
Able's History

Since 1954
Production and engineering breakthroughs achieved during WWII led to new and exciting metal finishing technologies as industry shifted from the war economy. Our founder, Zen Pokvitis was on the leading edge of those developments, and focused his chemical background on production applications for electropolishing. That experience in chemical formulation and equipment design led to the founding of Able Electropolishing Company in 1954, focusing on the needs of metalworking companies nationally.

The Next Generation of Able Innovation, Service and Expertise
Today, Able is America's largest electropolishing specialist, employing over 150 people on three shifts. The company operates a state of the art facility in Chicago, IL. Literally thousands of companies world-wide employ Able technology into their metal parts, with nearly every industry utilizing the techniques developed and later refined by our founder.

Though our technology plays a vital role in serving customers, the traditions of service and attention to quality are what make Able a unique company. We have long recognized that metal finishing is the "last step" for many companies designing and producing metal parts. Our entire company is tuned to the concept of doing the job right the first time. We are often the lifeline for companies faced with assembly line shutdowns due to parts that are late or malfunctioning. Being part of the solution and meeting tough deadlines has kept Able as the preferred vendor for so many companies.

Try Electropolishing on Your Part for FREE
Will our process lower your production costs and/or improve quality? You'll never know unless you try, and we make experimentation easy on you and your budget.


2. Send us your sample part. Include details on the alloy and problem you are encountering. Include a drawing if available.

3. No Charge We will electropolish your sample part (usually in 48 hours) and rush it back to you for your testing and evaluation.

The chemistry set that started it all.

The Next Generation of Able Innovation, Service and Expertise

An early electropolishing tank.
Custom Packaging

At Able Electropolishing, packaging is often a critical part of our process. Expensive and fragile components need proper protection in transit, and we work with thousands of customers worldwide to develop packaging methods that are effective and affordable. With experience spanning over 55 years and hundreds of thousands of packages, we often have the best solution for nearly any part.

We classify our packaging into two main headings: Bulk and Special. Bulk packaging methods offer the lowest cost solutions for protection. Special packaging options can be numerous, much requiring fine detail work or clean-bench sealing.

Post-Process Bake-Out

Due to the release of Hydrogen during the process, electropolishing does not cause Hydrogen Embrittlement. However, when a post chemical bake-out is required, Able is equipped with a Blue M Electric oven that bakes out your parts in an Oxygen-free atmosphere with a continuous Nitrogen flow.
Capabilities

As part of being an ISO 9001:2008 registered company, and supplier to medical device and aerospace customers nationwide, Able Electropolishing has completed the validation of its electropolishing process in accordance with “Quality Management Systems – Process Validation Guidance” authored by SG3 and endorsed by The Global Harmonization Task Force. We continue to add state-of-the-art equipment to keep at the forefront of our industry.

The guidance obtained from this document was used to assist Able to continue to improve our quality management systems to address the requirements of our manufacturing customers in all industries. Regulation of our aerospace and medical device customers has brought stricter quality requirements and has driven Able to continue to improve upon our quality systems.

While our medical device customers will require their electropolishing vendors to perform process validation, our diligence in addressing this should benefit our customers in all industries, as the steps taken have helped to insure that while operating within our specified parameters, we have demonstrated that our process will consistently yield product that will meet our customers' criteria.

Services Provided

We are ISO 9001:2008 certified. We completed the program in just over 7 months, a process that normally takes 2 years. Additionally, we are a certified ISO 13485 vendor for Medical device parts as well as a certified vendor for dozens of manufacturing companies in industries from Aerospace to Semiconductor.

**Electropolishing**: Our proprietary reverse plating technique offers solutions to a wide variety of metal surface problems. Brighten, deburr, size and passivate your parts all in one operation.

**Passivation**: An acid cleaning process designed to remove free iron from the surface of corrosion resistant steels. ABLE passivates per the ASTM A967 specification, as well as many other industry and customer-specific standards.

**Contract Cleaning**: Able provides contract cleaning services on metal parts from vapor degreasing to complex customer specific cleaning specifications.

**Titanium Electropolishing and Color Anodizing**: Deburr, passivate, and improve surface finish on your parts while providing easy identification through color coding.

**Laser Engraving**: Our on-site laser engraving department can engrave almost any part with whatever information is required, saving a step in the production of finished parts.

**Bake-Out**: Blue M Electric oven to bake-out parts in Oxygen-free atmosphere.

**Custom Packaging**: Many packaging options are available depending on your requirements, from bulk to sealed Nitrogen purged bags.