

## #1095 - Electropolishing Stainless Steel Springs for Increased Endurance

**INDUSTRY:**

Medical/Dental - Medical device manufacturing

**MFG/METHOD:**

Wire forming

**ALLOY:**

440A stainless steel

**Before:**



**After:**



**PROBLEM:**

In many cases, springs fail earlier than anticipated because of surface imperfections or irregularities. Cracks, notches and microdefects left on the surface of a spring compromise its longevity, and can become initiation sites for crack propagation or corrosion.

One common method of lengthening the life of a spring is shot peening, but not all springs lend themselves to this process. In cases like this one, more damage and distortion would be imparted on the spring, rather than improvement. The client needed to improve both corrosion resistance and endurance on the small, high-cycling spring (3/32" diameter, 5/32" long) pictured above.

**SOLUTION:**

The client came to Able Electropolishing to explore electropolishing as a method for improving the spring's corrosion resistance and endurance. Electropolishing is a common process for improving parts that cycle, bend and flex like springs, increasing endurance by improving surface finish and reducing the microdefects that can lead to premature failure.

When Electropolishing stainless steel parts, Able removes a uniform amount of surface metal, improving the microfinish consistently from part to part and lot to lot. By sampling the spring pictured above, Able found the optimal amount of surface material to remove in order to increase the spring's life cycle. Additionally, electropolishing the stainless steel removed any embedded contaminants in the outer skin of metal that could have become sites for corrosion. It also improved the chromium to iron ratio on the surface of the parts, making the springs more resilient to corrosion.

*Note: Able Electropolishing can apply this same process to improve part endurance not only for stainless steel, but for many other alloys commonly used in spring manufacturing.*