

## Anodizing Pen

### Market and Background

Currently, an IBISWorld report assesses that the services of electroplating, plating, polishing, anodizing, and coloring of metals account for almost one third of the \$23.8 billion revenue in the US metal treating market. Specifically, there is significant use of anodized aluminum in consumer, commercial, and industrial goods. According to the Aluminum Anodizers Council (AAC), “anodizing is an electrochemical process that converts the metal surface into a decorative, durable, corrosion-resistant, anodic oxide finish.” The current demand from manufacturers and designers who require metal with these imparted qualities continues to drive this market segment which is projected to see growth in the coming years.

Generally, the process of anodizing a metal object involves submersion in an electrolyte bath, followed by the application of an electrical current to alter the metal’s surface. The issue with this process is that all surfaces of the metal object in contact with the electrified acidic solution will be anodized. If there is a need to not anodize specific areas of the metal, these sections must be masked prior to starting the anodizing process. Proper masking can be accomplished using rubber or plastic plugs or by applying specialty tapes and other adhesive-backed materials. However, this process of masking can be labor intensive, require considerable strategic planning, and in the end may still not be able to fully achieve the desired functional or aesthetic outcome after anodizing. A tool is needed for precision anodizing and metal treatment that eliminates the need for masking and provides users with better design and artistic freedom.

### Development Status and Commercialization Needs

Two students from the University of Wisconsin – Parkside have developed a pen that can be used to anodize metals in a controlled and precise manner. With the push of a button, this device can apply a charged electrolyte solution and allow the user to anodize the metal in the design or pattern of their choosing. It has been built with an interchangeable tip to allow for anodizing in varying widths and textures. Additionally, the user has the capability of altering the applied voltage through toggle buttons on the pen instead of restricting this function to only the voltage source. Ultimately, this device could replace the traditional masking and electrolyte bath process in detail-oriented anodizing treatments. Thus, this technology not only has application in metal treating facilities, but also in the hands of artists and hobbyists using metal as their medium.



WiSys is seeking a strategic partner skilled in the process of metal treating and finishing who could provide a route to market for the commercialization and use of this anodizing pen. The current prototype has demonstrated the capability of anodizing metal, but additional development and testing is needed for other metal treatment and finishing processes.

### Applications and Key Benefits

- Ergonomic hand-held metal anodizing pen.
- Eliminates the need for masking and allows for precision anodizing in desired patterns.
- Designed with interchangeable tips to allow for varying widths and textures while anodizing.
- Power to pen controlled via user activated button for safety.
- Voltage level can be changed using toggle buttons on the pen.
- Built with capability of varying the flow rate of electrolyte solution
- Designed with safety in mind to prevent accidental shock during use.
- Reduces chemical waste created during the traditional anodizing process.
- Device could be scaled into an array format for anodizing multiple units with the same pattern.

### Intellectual Property

A patent is pending for this technology. For more information, please contact [licensing@wisys.org](mailto:licensing@wisys.org).