

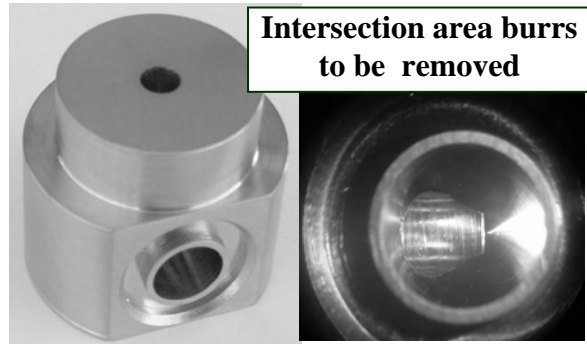
Edge and Surface Finishing of a Stainless Steel Valve using the FARADAYIC Process

Objective:

This project demonstrated the feasibility of using the patented FARADAYIC Process for edge and surface finishing of channels in a stainless steel valve.

Summary:

The FARADAYIC Edge and Surface Finishing process was used for deburring the internal passages of high value-added stainless steel valves and subsequently polishing the channels. The point of interest is located at the intersection of two channels inside the valve part. This technology adaptation project was structured with success criteria for 1) finishing the point of intersection where the two internal channels meet, and 2) polishing each passageway which will allow for the elimination of the electropolishing step. Collectively, these two criteria offer the client a reduced cost, performance-based, more environmentally friendly metal finishing capability. This process utilized a water-based sodium chloride/sodium nitrate solution, and the processing time was on the order of 45 seconds.



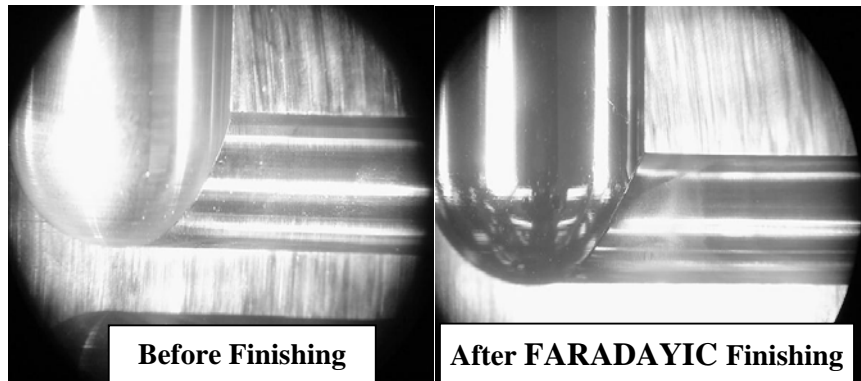
Intersection area burrs to be removed

Orifice Dimension: ϕ 0.4 in and ϕ 0.2 in

Background:

The patented FARADAYIC Process is an electrochemical manufacturing technique that utilizes a controlled electric field to either polish or shape a metallic work piece. Since the FARADAYIC Process is electrically mediated, it does not require aggressive

chemicals to facilitate the metal removal as needed in conventional chemical processes (e.g. chemical etching). The material removal rate is determined by the applied electric field, which is user-defined and computer controlled. This provides the means for precise control of the length of the process and the total material removed. Additionally, the use of neutral salt solutions (e.g. sodium chloride and sodium nitrate) as the electrolyte makes the process both worker and environmentally safe.



Before Finishing

After FARADAYIC Finishing

The FARADAYIC Process technology illustrated above is protected by a substantial patent portfolio including issued, allowed, and pending patent actions.