Cervical Cancer Diagnostic Device Improved Through Creative Engineering and Surface Treatment



A SilcoTek® Case Study:

beswick engineering

Excellence in Miniature

"At Beswick, we understand that some engineering challenges require looking beyond the component itself. By working closely with our customers and leveraging the expertise of partners like SilcoTek, we can explore specialized materials and surface treatments to help address demanding application requirements. This project reflects our commitment to looking beyond standard solutions and working with our partners to identify components and materials that meet each application's specific needs."

The Objective:

A medical diagnostic equipment manufacturer needed a reliable solution to prevent clogging in a precision stainless steel fitting used in equipment for cervical cancer diagnostics. Because the fitting contained extremely small internal pathways, even minor buildup could interfere with fluid flow and equipment performance. The goal was to prevent material accumulation while maintaining the fitting's compact dimensions and existing design.

The Challenge:

The stainless steel fitting was exposed to a process fluid consisting of water, alcohol, and Ethylenediaminetetraacetic acid (EDTA), a powerful chelating agent. As the fluid passed through the fitting and subsequently dried, residue and potential surface interactions contributed to clogging within its small internal passages. Beswick®, the engineering partner responsible for the fitting, faced a difficult design trade off. Increasing the size of the internal pathways could help reduce clogging, but doing so would introduce dimensional constraints and potentially require changes to the equipment.

Rather than compromise the equipment's design, Beswick's creative engineers explored an alternative approach: addressing the interaction between the process fluid and the fitting's stainless steel surface.

The Solution:

Beswick partnered with SilcoTek® to explore whether a surface coating could help prevent the buildup responsible for clogging. Together, the teams identified SilcoTek's Dursan® CVD coating as a promising solution.

Dursan is an ultra-thin, chemically resistant barrier coating that modifies the surface properties of stainless steel. By reducing metal-fluid interactions and lowering surface energy, Dursan helps minimize unwanted surface interactions and material adhesion. Applying Dursan to the fitting offered a way to address the clogging challenge at the surface level without requiring larger internal pathways or sacrificing the equipment's compact design.

The collaboration brought together Beswick's engineering expertise and willingness to explore unconventional solutions with SilcoTek's specialized coating technology. Rather than treating the problem as solely a design limitation, the teams worked together to identify a solution rooted in surface chemistry.

The Results and Benefits:

The project demonstrated the value of combining thoughtful engineering with advanced surface technology. Key benefits of this collaborative approach include:

- Maintained compact design by avoiding reliance on larger internal pathways that could compromise equipment size constraints.
- Reduced surface interactions with Dursan's barrier properties help minimize interactions between process fluids and the underlying stainless steel.
- Improved resistance to material buildup through lower surface energy helps reduce unwanted adhesion and sticking within small fluid pathways.

Many times the best engineering solution isn't changing the component's design, but changing how its surface interacts with the process. By working together, Beswick and SilcoTek expanded the possibilities for solving a challenging application and helping their customer maintain the performance and compact design of critical diagnostic equipment.

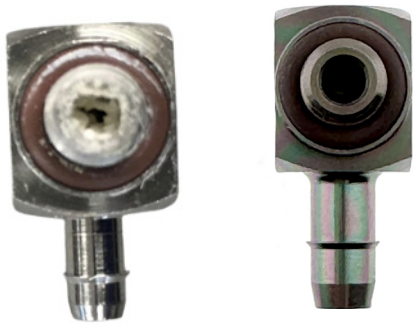

Image 1: Uncoated fitting with build up clogging the fluid pathway (left). Coated and clean fitting with a clear fluid pathway (right).