

Heart Valve Ultrasonic Welding System



Challenge

A medical device manufacturer needed a system to fixture, precisely map the lapped seam profile, and uniformly weld several aortic and mitral heart valves component sheets.

Solution

The recipe-driven software interface collects work order, part number, and drawing data per each batch of either aortic or mitral valve components. Prior to each batch, the Z-height probe is automatically calibrated to a Z-Datum to ensure consistently accurate profile measurements.

An un-welded sheet with multiple components is manually loaded and clamped to one of two fixtures placed 180-degrees apart on a rotary table prior to the cutting/singulation operation. This configuration aids in rolling the sheet into a tube with precisely registered edges. By precisely measuring Z-height variations across a lapped joint between the ends of the rolled, pre-cut sheet of polyester, the system creates quality ultrasonic welds by adjusting the height of the weld head during the creation of the welded joint.

The rolled sheet is positioned beneath the ultrasonic welder where an integrated precision touch-probe samples points across each seam to measure the seam profile prior to welding. The welder precisely tracks the profile to ensure a high-quality, consistent weld. When the current weld cycle completes and the operator engages the two safety triggers, the rotary table indexes, allowing the operator to remove the welded sheet and load a new un-welded sheet.



Result

The system provides an accurate and robust tool for the fixturing and ultrasonic welding of polyester/mylar aortic valve component sheets. The automated system produces 100 pre-cut, multi-part sheets per hour with a z-axis accuracy of +/-12.7µm.

About DWFRITZ Automation

Established in 1973, DWFRITZ Automation designs, builds, and supports engineer-to-order automation systems and high-speed, non-contact metrology platforms, as well as provides world-class build-to-print manufacturing capabilities to clients.

