

Microfluidic Cartridge for Biological Particle Concentration

At A Glance

Customer

Biotech company

Product

Microfluidic device for biological particle concentration

Services/ Market

Biotech, Healthcare

Challenges

A principal challenge in the design of the consumable was the interface with the instrument. There were multiple pressure and valve interfaces to the instrument which required precision engagement.

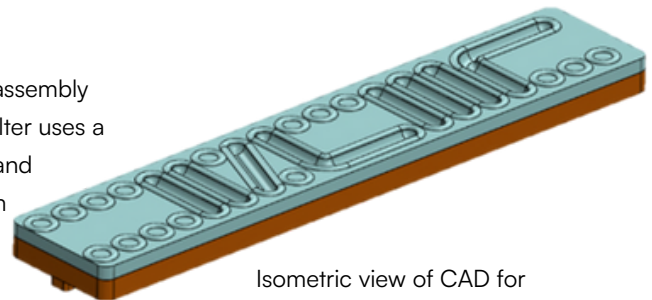
Summary

A biotech startup customer specializing in advanced infectious diseases diagnostic technologies, approached Gener8 for the development of a low-cost, filtration-based device that concentrated biological particles suspended in liquid from a feed suspension.

Methods Employed

Gener8 designed a microfluidic control using a sliding valve. The precision engagement required between the instrument and cartridge was achieved by employing a linear actuator in the instrument to engage with the sliding valve. This actuator advances the valve through seven different valving states to accomplish fluid control. Due to the multiple pressure and vacuum interfaces to the instrument, Gener8 designed ports that interfaced with a manifold in the instrument.

The cartridge was designed out of multiple materials and utilized assembly processes such as ultrasonic welding and press fits. The internal filter uses a polycarbonate track etch membrane which was bonded in place and hermetically sealed using ultrasonic welding. A geared mechanism was engaged by the instrument to deploy a 100 mm tubing for collection of sample from the bottom of the sample container.



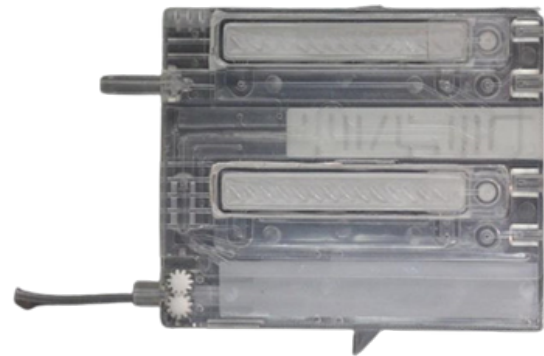
Isometric view of CAD for the cartridge.

Solution

Gener8 met the customer's requirements in designing and developing a simple, easy to use, cartridge for biological particle concentration. We developed microfluidic channel design that reduced velocity of cartridge output while maintaining pressure requirements.

Expertise Employed

- Microfluidics design and testing
- Filtering mechanisms
- Thermal bonding
- Over-molding
- Project Management



Top view of the commercially available device.