

Rescue project of a microfluidic device for detection of antibiotic resistant bacteria

Summary

A biotech startup customer specializing in molecular diagnostics, approached Gener8 with a rescue project for a low-cost, fluorescence-based microfluidic cartridge to determine the presence of antibiotic resistant bacteria. The cartridge had to be capable of performing a multiplexed assay in a semi-high throughput manner.

Methods Employed

G8 replaced the cam valve with a sliding valve on each side with a back channel that allowed for a precise movement of the valve while distributing the sample evenly between 8 or 16 wells. Multiple connections between the different halves that had to be hermetic and had to encompass the sample and detection wells. Using over-molded elastomers, we were able to connect different parts manufactured from different materials.

At A Glance

Customer

Biotech company

Product

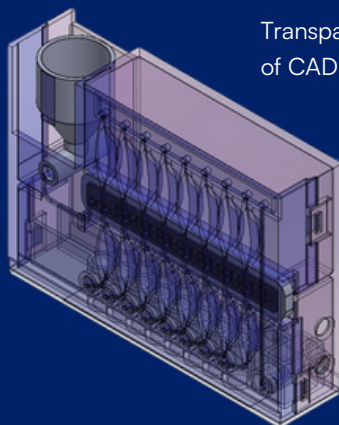
Microfluidic device for detection of antibiotic resistant bacteria

Services/ Market

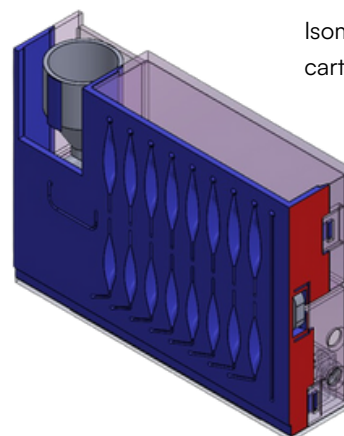
Biotech, Healthcare

Challenge

The principal challenge was to condense the design of a cartridge capable of running either 8 or 16 assays simultaneously. The cam valve timing on the cartridge was inaccurate. The device had to be capable of working with sample types including blood, oral swab, urine, and fecal matter, such that cross contamination was eliminated. Another challenge involved designing an instrument-driven consumable containing multiple reagents including lyophilized beads, magnetic beads, wash buffers, lysis buffer and binding buffer. A method to prevent leakage of the reagents was developed.



Transparent isometric view of CAD for cartridge.



Isometric view of CAD for cartridge.

Solution

Gener8 met the customer's requirements in designing and developing a simple, easy to use, cartridge for rapid detection of differential growth patterns of different bacteria from various sample matrices including blood, oral swab, urine or fecal samples. The low-cost onboard sliding valve directed fluid for incubation, mixing and detection. Hydrophobic membranes metered fluid volume and prevented contamination of instrument.



Culture-free test cartridge designed for ease of use, contain all the required reagents to perform the test.

Expertise Employed

- Microfluidics design and testing
- Computational fluid dynamics
- Over-molding
- Laser welding
- Project Management