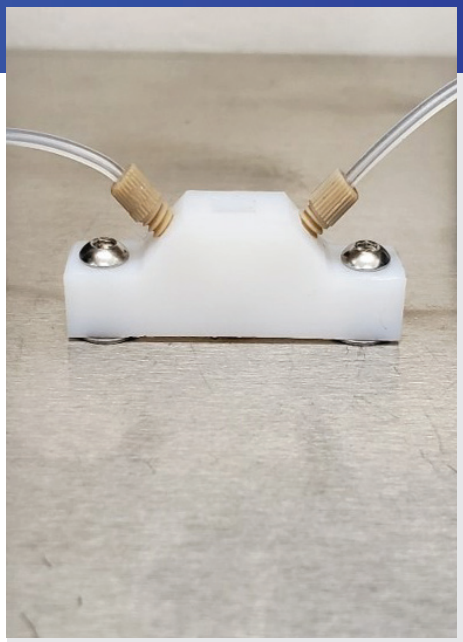
3M Science. Applied to Life.™

Case Study:
Bioelectronics

Polymer Forge turns to innovative technology for customized solution



Polymer Forge, Inc. is a start-up company in Madison, WI pioneering new innovations in bioelectronics. To accomplish their research, they needed to simulate an environment to meet the very different sets of constraints for working with living cells, biochemicals, and electronics, simultaneously.

Polymer Forge very quickly realized the value in partnering with 3M and utilizing industry-first 3D printed PTFE for two reasons: The need for rapid iteration and evaluation and PTFE's unique physical properties.

"Finding a source that could provide all we needed turned out to be more difficult than we had imagined, until we learned that 3M offered 3D printing with PTFE in a small lot size and with the design flexibility we needed," states Polymer Forge founder and president, Dan Burgess.

Challenge

Need for a specialized geometry to accommodate a large range of electronic components in a chemical resistance material

Solution

Custom 3D printed PTFE reaction chamber

Insight

Utilized design freedom of 3D printing for unique geometry and intricate features with properties of PTFE

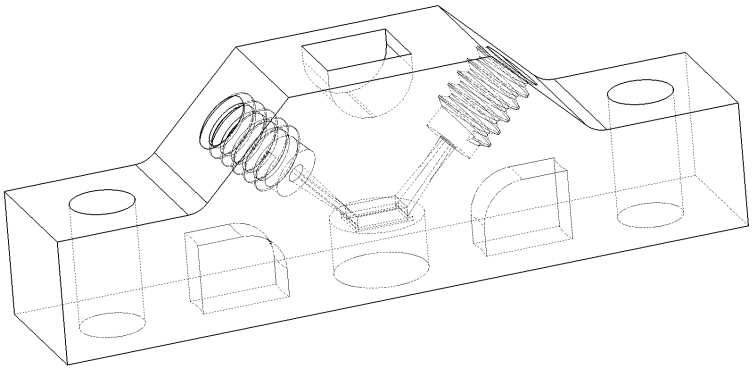
Why PTFE

Provided chemical resistant, custom parts that are cost-effective and can be rapidly iterated and evaluated

Industry

Bioelectronics

“The 3M scientists we worked with were quick to understand our specifications and provided us with exactly the part we needed in a timely manner and at a reasonable cost to move our research forward,” adds Burgess.



The reaction chamber had to be custom-designed and built to accommodate the electronic components used in their research that tend to be inflexible and come in a large variety of unique shapes. With the flexibility of additive manufacturing, Polymer Forge can prototype multiple chamber designs with complex internal features to test varying electronic components quickly, eliminating complexity constraints of traditional manufacturing.

Additionally, PTFE’s unique physical properties were attractive to Polymer Forge. To perform assays on the biological samples they work with, they often need to flow harsh solvents, fixatives, and wash solutions over them. This is an aggressive process; PTFE’s nearly universal chemical resistance and wide service temperature range make it the ideal material to stand up to the demanding application conditions.

With 3M’s 3D printed PTFE parts service, Polymer Forge was able to create a custom reaction chamber for product development testing. Previously they were unable to do this with traditional manufacturing methods or with other 3D printed materials because of the need for PTFE’s chemical resistance and dielectric properties. This allows biological samples, chemical reagents, and electronic interfaces to be brought together in a small and optimally shaped reaction chamber while providing a window to allow light transmission for analysis.

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