High-Performance Diaphragms

Permanently bonding components in PTFE

Challenge	Particularly in the semiconductor sector, there are high demands on the axial pull-out forces of components that are to be connected with PTFE. In this area, the requirements for diaphragms in particular are very high. The design of the diaphragms must prevent contact between the insert and the medium.
Solution	By selecting a suitable material, it is possible to realize the required conformities to the membranes through the stamping manufacturing process.
Result/Conclusion	The embossing manufacturing process of diaphragms enables a higher load capacity of insert component connections and prevents contact with the medium. This has made it possible to significantly increase the axial pull-out forces of the component to be connected.

The demands placed on diaphragms are continuously increasing. As soon as they cannot withstand the mechanical and chemical stress in closed systems, contamination occurs. Such contaminations lead to failures, which are associated with enormous costs. At the same time, the components are subject to a wide variety of regulations with additional requirements. Here, the focus is mostly on the following areas:

- Food area according to (EU) 10/2011 and FDA 21 § 177.1550
- Medical area according to USP Class VI and ISO 10993-5
- Semiconductor technology (ultra-pure water, aggressive chemicals)

ElringKlinger Kunststofftechnik has succeeded in further developing membranes in such a way that they can withstand the required mechanical and chemical stresses while complying with strict regulations.

This is achieved through a permanent bond between the PTFE layer and the associated component. By further developing this connection, it has been possible to almost double the axial pull-out forces. These essential properties allow dynamic movements of the diaphragm, which greatly increases its range of application.

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