



## SPEARS ELASTOMER BONDED PTFE DIAPHRAGMS

TECH-2-No.105

TECHNOLOGY UPDATE

- Chemical Resistant PTFE Bonded to Premium Quality Elastomer Backing
- Available with High Grade EPDM, genuine Viton<sup>®</sup>, or Hypalon<sup>®</sup> Bonded Backing
- Eliminates Gas Accumulation Between Diaphragm and Elastomer Backing
- Eliminates Elastomer Backing Degradation
- Improved Sealing Surface Resiliency Over Solid PTFE Diaphragms

### Eliminating the Need for "Gas Barrier" PTFE Diaphragm

Diaphragm material selection for corrosive chemical applications, such as sodium hypochlorite, often requires the high chemical resistance of PTFE (polytetrafluoroethylene) in Diaphragm Valves. Specifications frequently call out "gas barrier" type diaphragms due to historical problems from chlorine and other gases' chemical attack on PTFE diaphragm elastomer backings.

The advent of the "gas barrier" diaphragm design evolved from problems with chlorine gas entrapment between a solid PTFE diaphragm and a separate elastomer backing used to protect the diaphragm from damage during valve operation. First encountered in metal valves used in corrosive fluid handling systems in the 1960's, off-gassing of system fluids produced chlorine gas that was found to permeate the PTFE material and extensively damage the elastomer backing. This was due to both entrapped gas accumulation and low quality or inappropriate backing material selection. Since the sustained entrapment of the gas is what produced breakdown of the elastomer, the first patented solutions to this problem incorporated designs that vented the entrapped gas from between the PTFE diaphragm and the elastomer backing layer.

The "gas barrier" design was later produced in which a thin layer of polyvinylidene fluoride (PVDF) material, having comparably low gas permeability, is placed between the solid PTFE diaphragm and its protective elastomer backing in an attempt to prevent gases from reaching the elastomer. Though relatively effective, this design only slows gas accumulation between diaphragm and backing material, requires a relatively lightweight backing in order to permit proper operation of the more rigid PTFE diaphragm, and selection of the most appropriate type and grade of elastomer backing material for the chemical application is frequently overlooked or not available.

Spears PTFE Diaphragm is produced as a laminate of a highly flexible PTFE lining chemically bonded to a heavier elastomer backing of high grade EPDM, genuine Viton<sup>®</sup>, or Hypalon<sup>®</sup> and can be special ordered with other elastomers. This bonded laminate design eliminates areas for gas entrapment between separate diaphragm and backing materials. More importantly, proper selection and use of high quality, premium grade elastomer backings virtually eliminates such gaseous chemical attack from the start. Use of the more flexible PTFE surface material with a thicker, bonded backing provides the chemical resistance of PTFE with improved resiliency for greater sealing capability than solid PTFE Diaphragms. The superior characteristics of Spears Bonded PTFE Diaphragms not only eliminate the need for the "gas barrier" type diaphragm found in many current specifications, but provide a more versatile, reliable product for corrosive fluid handling applications.

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*Progressive Products From Spears Innovation & Technology*

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