

Elastomeric Diaphragm Seals

Advances in Fabric-Reinforced Elastomeric Diaphragm Seals

Molded elastomeric diaphragms have been utilized in dynamic sealing devices as early as the 1940s. In the early 1960s molded fabric reinforced diaphragms were developed and used in a variety of industries. Mechanical and Design engineers were experiencing a growing need for frictionless, leak-proof seals, which required no lubrication and could function at high pressures. Today, these products are widely used in the automotive, water control and irrigation, natural gas and propane regulation, industrial, and consumer markets.

Fabric reinforced elastomeric diaphragm seals are most commonly manufactured in two forms: **single coat** and **double coat**. Single coat diaphragms have the elastomer on the high pressure side and fabric on the low pressure side of the diaphragm. These are ideal when the high pressure side remains constant. In applications where the high pressure side may alternate, the fabric is inserted between two layers of elastomer. This construction will eliminate any elastomer being “blown off” the fabric when exposed to pressure. This is typically referred to as double-coated.

For years, double-coated fabric reinforced seals have been manufactured by “forming” calendared or coated fabric sheet stock in compression molds. For many diaphragm designs, this process is adequate, but due to the calendared sheet being semi-cured or cured, it builds up stresses when formed in the compression mold. After being removed from the mold, the stresses are relieved and the diaphragm tends to relax. This can lead to inconsistencies in height and outside diameter dimensional integrity. Fabric which is initially centered tends to “oat” during the forming process and can often migrate to the surface. This condition can contribute to premature failure of the seal.



The DiaCom Proprietary Double-coat process has been developed so the elastomer is not “formed” from calendared sheet stock, but is molded from an equal amount of unvulcanized elastomer on each side of the fabric. This eliminates dimensional instability and ensures that the fabric is constantly oriented near the center of the part, which has traditionally been problematic with double coat diaphragms produced from calendared material. There are almost no limitations to the geometry of the part or sealing bead sizes which have been long associated with fabric reinforced parts. Long stroke requirements can now be addressed with nearly equal amounts of elastomer on each side of the fabric. Different materials can also be quickly substituted with the DiaCom double-coated process.

Diaphragm Design & Manufacturing Leader

DiaCom Corporation, an ISO 9001 and AS9100 certified company, is a recognized leader in the design, manufacture and application of innovative, high performance molded diaphragms. DiaCom serves a variety of markets worldwide including industrial, automotive, aerospace, food processing, water controls, medical instrumentation, appliances and others. DiaCom offers state-of-the-art diaphragms designed for cost effectiveness, ease of installation, durability, and high performance characteristics.

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