

Diaphragms in Pneumatic Applications

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Fabric reinforced diaphragms play a critical role in pneumatic control systems by providing a flexible, responsive, and durable interface between pressure changes and mechanical movement. They are typically made from a variety of elastomers and reinforced primarily with polyester and nylon fabrics. Nomex fabric can also be used in high temperature applications.

Diaphragms serve as barriers that separate two chambers while transmitting force based on pressure differentials. In pneumatic controls, when air pressure increases or decreases on one side of the diaphragm, it deflects proportionally. This deflection is then used to position valves, actuators, regulators, or switches.

Use in Control Valves

One of the most common applications is in diaphragm-operated control valves. The diaphragm receives a pneumatic control signal from an I/P (current-to-pressure) transducer or control system. As pressure changes, the diaphragm moves the valve stem to modulate flow. This ensures smooth, stable, and accurate process control.

Use in Pressure Regulators

Diaphragms also maintain consistent outlet pressure in pneumatic regulators. When downstream pressure drops, the diaphragm expands, allowing the regulator to increase flow. When pressure rises, the diaphragm contracts, reducing flow. This self-balancing mechanism enables precise regulation.

Use in Pneumatic Actuators

Diaphragm actuators convert air pressure into linear motion. They are widely used because they produce consistent force across the stroke, require minimal lubrication, and avoid friction issues found in piston-style actuators.

Material Considerations

Materials are selected based on temperature, chemical exposure, and required durability. Common materials include: nitrile, FKM, silicone, fluorosilicone and EPDM rubber most commonly reinforced with Polyester, Nylon or Nomex fabrics. Proper material selection ensures long operational life and reliable performance.

Advantages of using molded diaphragms:

- No lubrication required
- Low friction and wear
- Excellent leak resistance
- Suitable for sensitive control applications
- Ability to handle high pressure (with proper fabric selection)
- Ability to handle corrosive or hazardous media (with proper material choice)



Please contact your DiaCom team to answer any questions and discuss potential diaphragm designs.

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 diaphragm seals. DiaCom serves a variety of markets worldwide including industrial, automotive, aerospace, food processing, water control, medical instrumentation, appliances and others. DiaCom offers state-of-the-art diaphragms designed for cost effectiveness, ease of installation, conservation, durability, and high performance characteristics.

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