

Diaphragm seals can be used when the instrument should be isolated from the process. They are best suited for pressure and level measurements. They are often used in the following applications:

- Slurry or polymerizing services
- Toxic fluids
- Fluids at extreme pressures
- Corrosive fluids
- Avoid the use of special alloys
- To provide installation flexibility
- Elevated or cryogenic temperatures
- To avoid impulse line heat tracing
- To eliminate wet and dry legs
- Level transmitter mounting above the lower nozzle

Where platform space on towers is limited, diaphragm seals enable locating the level transmitter in a convenient location and avoid space consuming impulse piping.

It has limited applicability for situations that require small spans. Due their lower accuracy diaphragm seals have a reduced applicability for flow and interface measurements. In flow service they are used with slurries when purges are not acceptable. Wedge meters or eccentric flow tubes are used and the diaphragms seals are flush mounted on a saddle flange or a studding outlet. See Section 6.2.6 for further information on the application of wedge meters. Smaller flow elements use flow through seals or inline chemical tees.

See ASME B40.2 for further information on diaphragm seals.

### 9.2.1 Construction

A standard diaphragm seal has fill fluid enclosed in a chamber between a diaphragm and the measuring element. Frequently, to remotely locate the instrument, a capillary is used between the chamber that is in contact with the process and the measuring device to transmit the pressure reading. Since the seal diaphragm only displaces a small volume itself, transmitters and indicators that have microscopic displacements should be used.

The interior of the diaphragm seal is completely filled with liquid. Diaphragm seals are filled under a deep vacuum and then carefully sealed. Even a small amount of remaining vapor causes significant thermal errors.

Diaphragm seal type and the fill fluid should be selected based on the process fluid data. The chamber, diaphragm and gasket materials should be compatible with the process fluid. The diaphragm seal assembly should have a fully welded construction. For transmitters threads should not be used as a sealing surface for the fill. It's critical that air does not leak into the assembly by mishandling.

Seals for transmitters are available in a variety of configurations: threaded, inline, flanged, etc. The seal itself might come with an integral process connection or with a separable flange. In addition,

