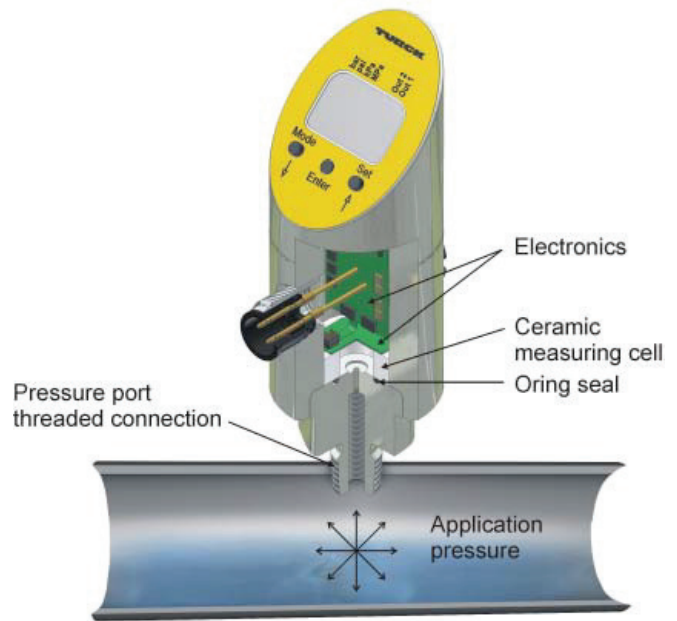
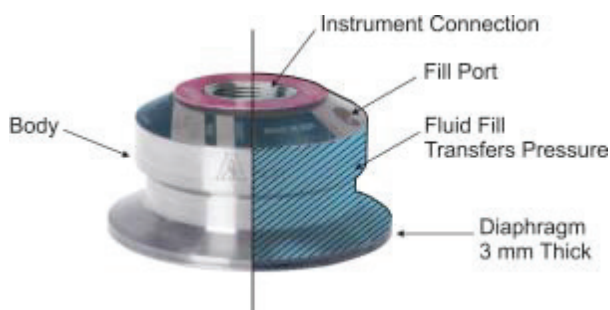


# How to Choose a Diaphragm Seal for Pressure Applications

HOW TO

In many pressure applications, it is necessary to isolate the sensing element from the material being sensed. The components used for the sensing element can be damaged or in other ways rendered useless from corrosive fluids in chemical applications, debris that clogs a sensor's port in wastewater applications or when a process connection is changed from threaded to sanitary in a dairy plant. A diaphragm seal, which is a barrier between a pressure sensor and the media it is measuring, can help protect the sensing element in these and other applications. Measuring pressure in any application begins by using a pressure sensor that has a port plumbed into a pressurized line or tank. The fluid in the line or tank exerts a force against the sensor's measuring element. The element is tied to electronics that convert the measured pressure to an electrical signal, such as an analog 4-20 mA output.

A diaphragm seal is used to isolate the media being sensed and the sensing element. The diaphragm seal is composed of three main parts: the housing, fluid fill and the diaphragm itself. The housing provides the process connection for the seal and contains the fill fluid. The fill fluid is application specific, and can vary for food and beverage or industrial applications. The diaphragm is a thin (approximately 3 mm thick) piece of metal that is in contact with fluid. Since the diaphragm housing is fluid filled, application pressure is transferred from the line or tank through the diaphragm seal to the fill fluid and finally to the sensor's measuring element.



In many chemical applications, the material used for the sensor and media are chemically incompatible, prone to corrosion or pitting. A diaphragm (or entire) seal may be constructed from many different materials that are more chemically resistant than the material used for the sensor. For example, 316L stainless steel, hastelloy C276 or inco-nel are able to be used in chemical applications.



General Purpose



Fully Welded Mini Seal

Another reason to choose a diaphragm seal is to prevent media containing particles from clogging the small measuring port of a standard sensor. Many flush diaphragm seal options are available for glue, waste water, resins, paint and other materials that would typically clog standard sensors. A flush mount diaphragm seal is also an option for applications where water may freeze and expand in the port of sensor.



Flush Mount Threaded

Finally, one would choose a diaphragm in an application where a different process connection is required or desired. For example, specific connections are required in the food and beverage industry, such as 3A rated fit-

tings. The 3A standard was created by the dairy industry as a voluntary benchmark for product performance and sanitary safety. The standards cover a wide range of equipment and materials including fittings/connections, because connector threads on a standard sensor provide a space where bacteria could grow. The tri-clamp fitting is a 3A rated sanitary process connection, because it is not threaded and constructed in accordance with the 3A standard. Other sanitary diaphragm seal process connections include the Cherry-Burrell fitting, bevel seat and Anderson long and short shells.



Tri-Clamp



Bevel Seat



Cherry-Burrell



Anderson Long Shell