

Diaphragm Performance

Application.

Diaphragm Seals are required when there is a possibility of damage to the primary instrument: -

1. By corrosion or damage to the wetted parts of the instrument.
2. By sediment or solidification of the process medium (plugging).

They are also required where the instrument is used to control a sanitary or septic process. In this case the diaphragm is used as a barrier at the process wall and subjected to Clean In Place (CIP) sanitising.

Configuration.

Benney has two types of diaphragm :-

1. **General purpose.** This type is used in non sanitary applications and generally allows use of a larger size of diaphragm and is therefore more sensitive for any given process connection size. It is located in place by a retaining ring and then the retaining ring, diaphragm and seal body are welded together. With this arrangement the retaining ring becomes part of the sealing surface and allows different wetted materials to be used in conjunction with 316 L stainless steel seal bodies and thus reducing cost.
2. **Sanitary.** This type is used mainly in food and beverage processing. The diaphragm is always smaller in diameter than the process connection size; eg, a 50mm Triclover seal will have a 40mm diaphragm. This is because the diaphragm, diaphragm weld and surrounding area are required to have no crevices or places where product can build-up and bacteria may form that cannot be cleaned by the CIP process.

Diaphragm Materials.

Standard diaphragm 316L stainless steel. Titanium, Monel, 304 stainless steel, Tantalum and Hastelloy C276 are also available in some applications.

Sensitivity

Accuracy of the transmitter can be affected by the size and type of diaphragm. Generally the best performance will be obtained by use of the largest diaphragm possible.

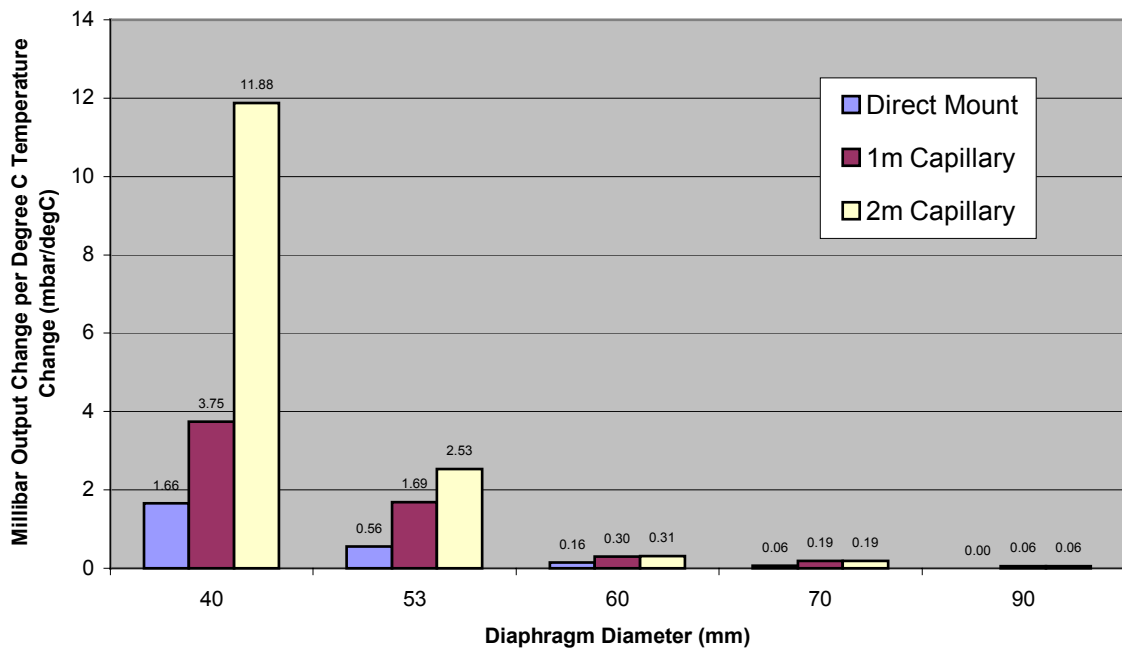
Diaphragm Size	Minium		Sanitary
	Range	Span	
22	-50 kPa	1500 kPa	Yes
27	-80kPa	600 kPa	Yes
33	-80kPa	400kPa	No
40	-100kPa	100 kPa	Yes
53	-100kPa	50 kPa	No
60	-100kPa	10 kPa	No
70	-100kPa	500mm H ₂ O	Yes
90	-100kPa	250mm H ₂ O	No



Temperature Effect Gauge Pressure.

The Temperature Effect on a **Standard Diaphragm** (316L Stainless Steel) with Silicon oil DS200 **100cs** fill.

Millibar Output Change due to Temperature for Different Capillary Lengths



Temperature Effect Differential Pressure.

In "DP" situations zero shift due to ambient temperature is self-correcting provided all parts of the system are subjected to the same ambient conditions.