

Diaphragm Seals

DS/PI-02

VOLUMETRIC DISPLACEMENT OF TYPE 300 VITON DIAPHRAGM SEAL

When a diaphragm seal is attached to a pressure measuring element, the diaphragm must have sufficient displacement to operate the element and have a minimal effect on the unit accuracy. The effect, if any, on the accuracy is due to the fact that the diaphragm adds to the spring rate of the pressure element/seal assembly.

The Viton Diaphragm Seal was designed primarily for use with pressure gauges (ASHCROFT® Type 1188) having ranges below 15 psi, however it is suitable for use with other low pressure instruments or with Bourdon tube gauges.

The volumetric spring rate curve for the Viton Seal shown below will allow you to predict the effect of the diaphragm on any pressure element with a known volumetric displacement.

An 1188 gauge has a volumetric displacement of 0.1 cubic inches. The curve shows that for displacements up to 0.3 cubic inches the diaphragm adds no measurable spring rate to the assembly (bellows gauge attached to the seal) and, therefore, will not affect the accuracy or require any recalibration.

For another pressure element having a range of 50" H₂O and a volumetric displacement of 0.4 cubic inches the diaphragm would require (from the curve) 0.5 inches of H₂O for full indication. Since 0.5" H₂O is 1.0% of the range this is the error induced by the diaphragm. Depending on the total accuracy required, the element may have to be recalibrated.

The curve also includes vacuum and can be used for both vacuum or pressure applications.

