

MINIMUM AND MAXIMUM PRESSURES FOR DIAPHRAGM SEALS

PIP #: DS-PI-82

Applicable to:
Diaphragm
Seals and
Isolation Rings

Diaphragm Seal and Isolation Ring Displacement Guide

To ensure that pressure is properly transmitted by a diaphragm seal, the seal’s diaphragm must provide sufficient displacement to drive the sensing element of the instrument(s) attached. As a general guideline, the lower the pressure to be measured, the larger the sensing elements are. Therefore, each diaphragm’s maximum displacement will correspond to a minimum span for a given class of instrument.

Table 1 below provides a simple lookup for the minimum span allowable for pressure instruments when attached to different diaphragm seal models. Contact Ashcroft for guidance when attaching instruments to a single diaphragm seal. It is important to note that the values found within the tables are minimum and maximum spans, not ranges. For example, both a 30 psi gauge and a Vac/15 psi gauge have the same overall span of 30 psi.

| Model | Material | 2.5" and 3.5" Gauges | 4.5" and Larger Gauges | | Low Pressure Gauges | Low Pressure Gauges | Differential Gauges | Digital Gauges and Transducers | Switches |
|----------------------------------|-----------------------------|----------------------|------------------------|--------------------------|---------------------|---------------------|---------------------|--------------------------------|---|
| | | 1009 | Duragauge, 1009 | 1259, 1209, T5500, T6500 | 1187, 1188, 1189 | P5500, P6500 | 5503 | DG25, 2X74, A2, etc. | All switches (values refer to minimum setpoint) |
| 100, 200, 300, 400, 500 – Series | Metallic Diaphragms | 15 psi | 30 psi | 30 psi | N/A | | N/A | 15 psi | 6 psi |
| | Viton and Kalrez Diaphragms | 15 psi | 15 psi | 15 psi | 10 IWC | N/A | 10 psid | 15 psi | 10 IWC (B-series) 20 IWC (all others) |
| | PTFE diaphragms | 15 psi | 15 psi | 15 psi | 60 IWC | N/A | N/A | 15 psi | 6 psi |
| 700-Series | Metallic Diaphragm | 15 psi | 15 psi | 15 psi | 30 IWC | N/A | 10 psid | 15 psi | 30IWC |
| 510/511-Series | Metallic Diaphragm | 30 psi | 30 psi | 15 psi | N/A | N/A | N/A | 15 psi | 6 psi |
| | | 100 psi (XHP) | 100 psi (XHP) | 100 psi (XHP) | | | | | |
| 330 Flush Mini Seal | Metallic Diaphragm | 60 psi | N/A | N/A | N/A | N/A | N/A | 15 psi | 6 psi |
| 310/315 Mini Seal | Metallic Diaphragm | 15 psi | N/A | N/A | N/A | N/A | N/A | 15 psi | 6 psi |
| 311/312 Midi Seal | Metallic Diaphragm | 15 psi | 30 psi | 30 psi | N/A | N/A | N/A | 15 psi | 6 psi |
| 320 Tri-clamp Seal | Metallic Diaphragm | 15 psi | 15 psi (2"only) | 15 psi (2"only) | N/A | N/A | N/A | 15 psi | 6 psi |
| 80,81,82 | Elastomeric | 15 psi | 15 psi | 15 psi | N/A | N/A | N/A | 15 psi | 6 psi |
| Isolation Rings | | | | | | | | | |
| DF Seals | 1" | 160 psi | 160 psi | 160 psi | N/A | N/A | N/A | 15 psi | 6 psi |
| | 1½" | 60 psi | 60 psi | 60 psi | N/A | N/A | N/A | 15 psi | 6 psi |
| | 2"+ | 15 psi | 15 psi | 15 psi | N/A | N/A | N/A | 15 psi | 6 psi |
| | Metallic Diaphragm | N/A | N/A | N/A | N/A | 10 IWC | N/A | N/A | N/A |

Table 1 - Minimum Pressures for Diaphragm Seals

Diaphragm Seal and Isolation Ring Maximum Allowable Working Pressures

Table 2 below contains the maximum pressures for the various types of seals. Instruments attached to a seal must have a range less than or equal to the seal’s maximum pressure.

| | Seal Model | Diaphragm and Lower Housing Material | MAWP | MAWP with XHP Option |
|--------------------------------------|--|---|---|----------------------|
| Threaded, Clamped, and Weld-in Seals | 100, 101, 200, 201, 300, 301, 104, 204, 105, 205, 107, 207, 108, 208 | All-metallic construction | 2,500 psi | 5,000 psi |
| | | Viton or Kalrez Diaphragm | 500 psi | N/A |
| | | PTFE diaphragm | 2,500 psi | N/A |
| | | PVC or PVDF lower housing | 200 psi | N/A |
| | 400 | | 2,500 psi | 9,000 psi |
| | 401 | | 2,500 psi | 5,000 psi |
| | 500, 501 | | 500 psi | N/A |
| | 510 | | 1,500 psi | 10,000 psi |
| | 511 | | 1,500 psi | 5,000 psi |
| | 311/312 | | 1,000 psi | N/A |
| | 310/315 | | 2,500 psi | N/A |
| | 740/741 | | 750 psi | N/A |
| | 330 | | 3,000 psi | N/A |
| 320 | | Per clamp mfr. | N/A | |
| Flanged Seals | 102, 103, 106, 202, 203, 206, 302, 303 | All-metallic construction | Per ASME B16.5 Flange Class | |
| | | Viton or Kalrez Diaphragm | Lower of 500 psi or ASME B16.5 Flange Class | |
| | | PTFE diaphragm | Lower of 2,500 psi or ASME B16.5 Flange Class | |
| | | PVDF lower housing | Lower of 200 psi or ASME B16.5 Flange Class | |
| | | PVC lower housing | Lower of 75 psi or ASME B16.5 Flange Class | |
| | PTFE lower housing | Lower of 270 psi or ASME B16.5 Flange Class | | |
| | 402/403, DF | | Per ASME B16.5 Flange Class | |
| 702/703 | | Lower of 750 psi or ASME B16.5 Flange Class | | |
| Isolation Rings | 80 and 81 Flanged Isolation Rings | | Per ASME B16.5 Flange Class | |
| | 82 Threaded Isolation Rings | | 150 psi | |
| | Gauge Model | Diaphragm and Lower Housing Material | MAWP | MAWP with XHP Option |
| Low Pressure Gauges | P5500, P6500 | All metallic construction | 300 psi | 3,000 psi |

Table 2 – Maximum Pressures for Diaphragm Seals