

The 100 Series Diaphragm Seals

Standard Features and Options

This series of seal utilizes a replaceable diaphragm clamped between o-rings making the assembly field repairable. This construction is attractive to facilities that have evacuation, filling, and calibration capability. The construction conforms to methods as described in the ASME standard B40.2 Section 2.3. The standard upper housing is classified as Noncontinuous Duty (see para. 2.3.2.3, ASME B40.2) with the Continuous Duty (see para. 2.3.2.1, ASME B40.2-1991) optionally available.

Consideration should be given to o-ring compatibility with process fluids and temperature. Listed below in Table 100.1 are applicable safe working temperatures.

Diaphragms with a diameter of 2.5" (63.50mm) are utilized in flanged process connections 1" (25.40mm) and smaller. The 2.5" (63.50mm) diameter diaphragm is also used in assemblies with pressure ratings higher than 2000 PSIG. All other configurations will utilize a 3" (76.20mm) diameter diaphragm. See Tables 100.2 and 100.2A for displacement curves and nominal ratings.

If the upper housing is removed from the lower housing, without the cleanout ring option, it will result in a loss of fill fluid.

Table 100.3 indicates the volume of fill fluid within the body cavity based on 1/2" engagement of the fitting in the instrument connection. This data is provided for error calculations attributed to expansion and contraction of fill fluids under varying temperature conditions.

The filling method for this series is as defined in ASME B40.2 Section 2.9.3.2(b) and 2.9.3.2(c).

Table 100.1 O-Rings

Material	Temperature Range
Buna -N	-10 to +300°F (23 to 149°C)
Teflon-TFE	0 to +100°F (-17 to 38°C)
Viton	-30 to +350°F (-34 to 176°C)

Table 100.3 Internal Volume

Instrument Connection NPTF(2)	Diaphragm Size Inches(mm)	Pressure Rating PSIG (MPa)	Cubic Inches
1/4"	2.5" (63.50)	See Note 1	0.307
1/4"	2.5" (63.50)	5000 (34.50)	0.352
1/4"	2.5" (63.50)	10000 (69.00)	0.353
1/4"	3.0" (76.20)	See Note 1	0.479
1/2"	2.5" (63.50)	See Note 1	0.424
1/2"	2.5" (63.50)	5000 (34.50)	0.648
1/2"	2.5" (63.50)	10000 (69.00)	0.624
1/2"	3.0" (76.20)	See Note 1	0.609

Notes:

1. Refer to Paragraph 3 for diaphragm diameter relation to size and pressure rating.
2. NPTF - as noted in subsequent sections refers to the American National Standard Dryseal Pipe Threads (ASME/ANSI B1.20.3) and applies to both internal and external threads. Although this type of pipe thread is theoretically designed to seal without the use of a sealant/lubricant, the use of one is necessary to achieve a truly leak free joint in practical applications.
3. Graph Interpretation (Displacement Bias vs. Displacement Volume): Displacement Bias versus displacement volume graphs are provided to aid the user in the selection of a diaphragm seal having minimal full span displacement bias effects. (Refer to Thermal Bias Calculation Section for additional information). **Note - This graph is not a representation of the maximum full span capability of the user's instrument.**

Table 100.2

Displacement Bias vs. Displacement Volume
2.500" Diameter Diaphragm

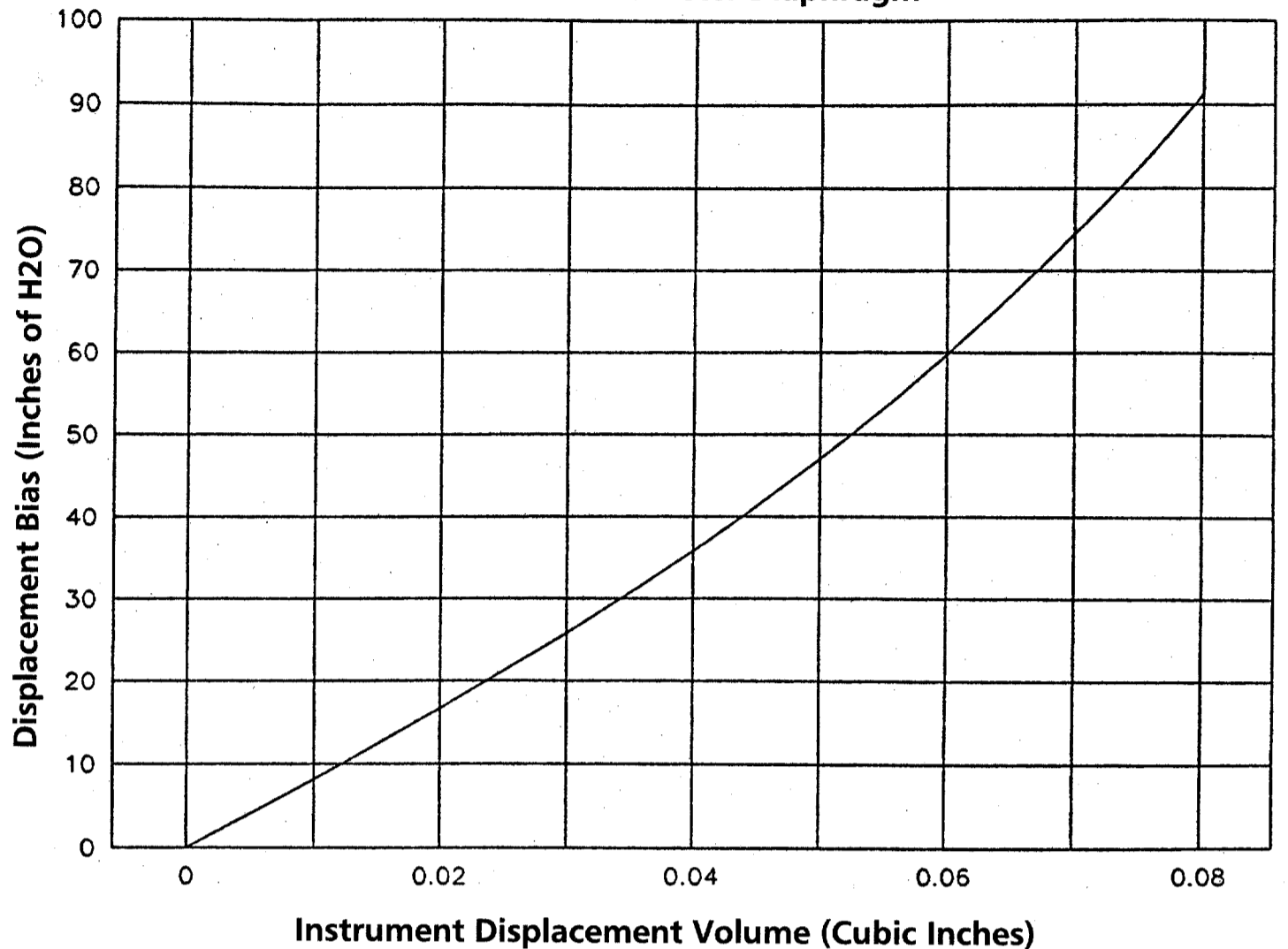
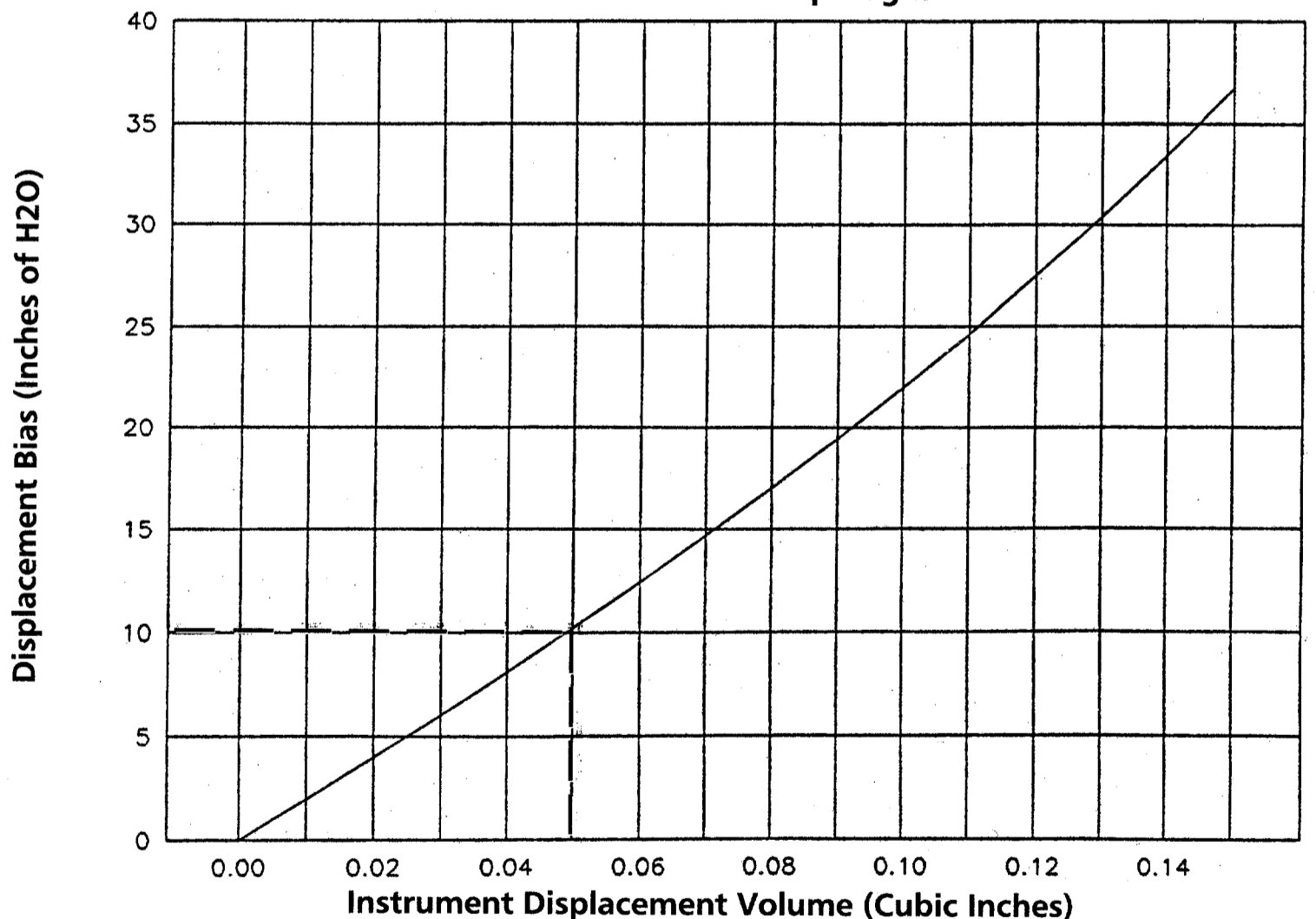


Table 100.2A

Displacement Bias vs. Displacement Volume
3.000" Diameter Diaphragm



As indicated by the graph, the displacement bias associated with the diaphragm spring rate is proportional to the instrument's required volumetric displacement. Instruments requiring less displacement will have a lower displacement bias. The maximum displacement capability of the diaphragm seal is specified for each series (i.e., 100A) in subsequent sections of the catalog. The user's instrument's required volumetric displacement should be below the stated maximum.

Example:

An instrument has a maximum full span displacement of 0.05 cubic inches. What is the full span displacement bias associated with the diaphragm spring rate, in inches of water, for a 3.000" diameter diaphragm?

From the graph in Table 100.2A:

An instrument with a full span displacement of 0.05 cubic inches has a maximum displacement bias of $\pm 10''$ H₂O.