BELLOFRAM ELASTOMERS

Bellofram
DIAPHRAGM DIVISION

BELLOFRAM DIAPHRAGM DIVISION

A BELLOFRAM ELASTOMERS BRAND

8019 OHIO RIVER BLVD. | NEWELL, WV 26050 | 1-800-727-5646

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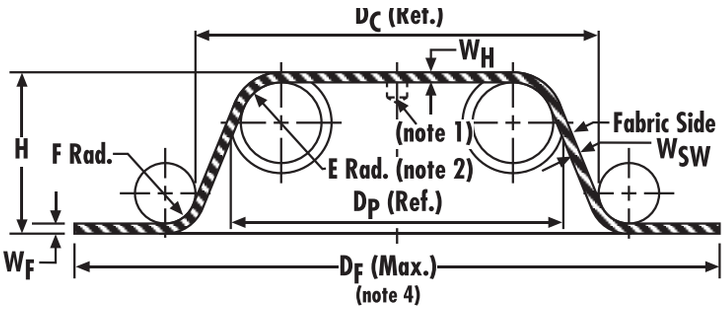
CLASS 4 DIAPHRAGMS

This is the most common diaphragm design, offering economical hardware design and developed for installation in mechanisms with flat mating surfaces between the cylinder and its cap or bonnet.

In these cases, the flange of the diaphragm primarily serves as a gasket to prevent leakage at these parting surfaces. Class 4 diaphragms can be used to seal high pressures since the fabric overlay is in intimate contact with the clamped metal surfaces, thus providing secure retention across a large sealing surface.

DIMENSIONS AND TOLERANCES



D_C	.25 to .99	1.00 to 2.50	2.51 to 4.00	4.01 to 8.00	8.01 and up
H	As required to yield design stroke (See standard size tables and Note 3 below.)				
D_C Dp	Tolerances on DC and DP are ± .010" per inch of diameter but the tolerance will be no less than ± .010" or greater than ± .060"				
W_H & W_F	.020 ± .005	.020 ± .005	030 ± .005	.035 ± .005	.045 ± .007
W_{SW}	.015 ± .003 (Code "B")	.017 ± .003 (Code "C")	.024 ± .004 (Code "D")	.035 ± .005 (Code "F")	.045 ± .007 (Code "H")
E	3/32 R.	1/8 R.	5/32 R.	1/4 R.	1/4 R.
F	1/32 R.	1/16 R.	3/32 R.	1/8 R.	1/8 R.
D_F	DC + 3/4" See Note 4	DC + 1" See Note 4	DC + 1-1/2" See Note 4	DC + 2" See Note 4	DC + 2" See Note 4

NOTES:
1. Standards are supplied with a button on the pressure side. 1/8" diameter x 3/32" high on bore sizes 1" and over.
2. This radius is not the piston radius since the head corner will be inverted at assembly.
3. Height should not exceed the bore (DC). Tolerance on height to be no less than ±.015" or greater than ±.015" per inch of height.
4. Trim tolerances.

Hole Diameter	OD Trim Tolerances
0 - 1.00"	±.010"
1.01 - 3.01"	±.015"
over 3.01"	±.020"

5. Dimensions and tolerances pertain to Bellofram Rolling Diaphragms as manufactured and not to dimensions and tolerances of mating parts.

DIAPHRAGM APPLICATIONS

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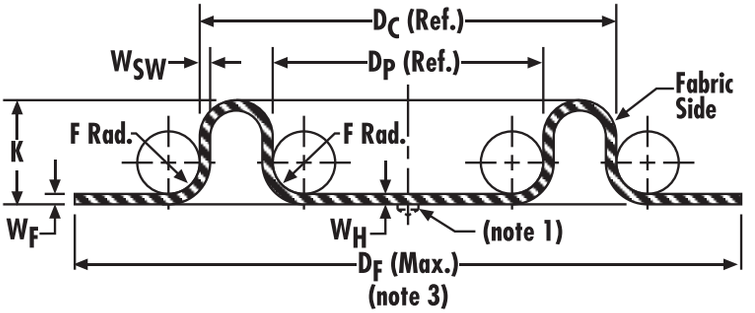
CLASS 4C DIAPHRAGMS

Similar to the Class 4, but with the convolution molded in. Because it is molded in the "as-installed" configuration, the Class 4C diaphragm doesn't need to be inverted at installation.

The pre-convoluted design has a small spring gradient, or centering effect, which tends to return the diaphragm to its "as-molded," or neutral plane, position. The design can be fastened to the piston with a flat retainer plate. Stroke of these diaphragms is limited.

DIMENSIONS AND TOLERANCES



D_C	.26 to .99	1.00 to 2.50	2.51 to 4.00	4.01 to 8.00	8.01 and up
H	As required to yield design stroke (See standard size tables and Note 2 below.)				
D_C / D_P	Tolerances on DC and DP are ± .010" per inch of diameter but the tolerance will be no less than ±.010" or greater than ±.060"				
W_H & W_F	.020 ± .003	.020 ± .004	.030 ± .004	.035 ± .005	.045 ± .007
W_{SW}	.015 ± .003 (Code "B")	.017 ± .003 (Code "C")	.024 ± .004 (Code "D")	.035 ± .005 (Code "F")	.045 ± .007 (Code "H")
F	1/32 R.	1/16 R.	3/32 R.	1/8 R.	1/8 R.
D_F	DC + 3/4" See Note 3	DC + 1" See Note 3	DC + 1-1/2" See Note 3	DC + 2" See Note 3	DC + 2" See Note 3

NOTES:
1. Standards are supplied with a button on the pressure side. 1/8" diameter x 3/32" high on bore sizes 1" and over.
2. Height tolerance is ± .015
3. Trim tolerances

Hole Diameter	OD Trim Tolerances
0 - 1.00"	±.010"
1.01 - 3.01"	±.015"
over 3.01"	±.020"

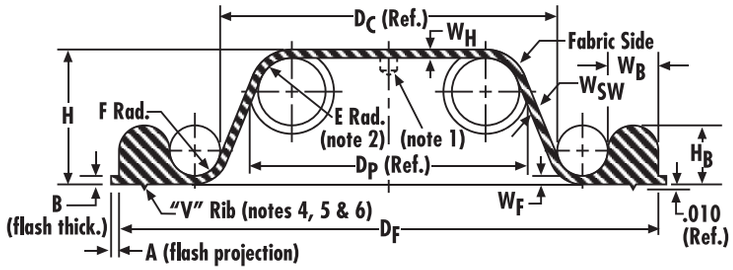
4. Dimensions and tolerances pertain to Bellofram Rolling Diaphragms as manufactured and not to dimensions and tolerances of mating parts.




CLASS 3 DIAPHRAGMS

A beaded flange, similar to an O-ring, seals the diaphragm via axial compression of the D-shaped bead. The bead is installed in a housing with a mating groove, eliminating the need for perforations in the diaphragm flange.

DIMENSIONS AND TOLERANCES



D_C	.37 to .99	1.00 to 2.50	2.51 to 4.00	4.01 to 8.00	8.01 and up
H	As required to yield design stroke (See standard size tables and Note 3 below.)				
D_C D_P	Tolerances on DC and DP are ± .010" per inch of diameter but the tolerance will be no less than±.010" or greater than ±.060"				
W_H & W_F	.020 ± .005	.020 ± .005	.030 ± .005	.035 ± .005	.045 ± .007
W_{SW}	.015 ± .003 (Code "B")	.017 ± .003 (Code "C")	.024 ± .004 (Code "D")	.035 ± .005 (Code "F")	.045 ± .007 (Code "H")
A	.025 Max.	.025 Max.	.035 Max.	.040 Max.	.056 Max.
B	.025 Max.	.025 Max.	.035 Max.	.040 Max.	.056 Max.
E	3/32 R.	1/8 R.	5/32 R.	1/4 R.	1/4 R.
F	1/32 R.	1/16 R.	3/32 R.	1/8 R.	1/8 R.
D_F	DC + 5/16"	DC + 1/2"	DC +3/4"	DC + 1"	DC + 1"
W_B	.094 ± .003	.125 ± .003	.187 ± .003	.250 ± .003	.250 ± .004
H_H	.095 ± .004	.135 ± .004	.200 ± .005	.270 ± .007	.270 ± .008

NOTES:
1. Standards are supplied with a button on the pressure side. 1/8" diameter x 3/32" high on bore sizes 1" and over.
2. The radius is not the piston radius since the head corner will be inverted at assembly.
3. Height should not exceed the bore (DC). Tolerance on height to be no less than ±.015" per inch of height.
4. This "V" rib is for diaphragm processing only. It may not appear on all diaphragms. It is not functional and need not be completely filled. Rib is normally on rubber side of diaphragm.
5. Two "V" ribs may be used on beads that are .25 or larger in width.
6. Number, size, spacing and location of "V" ribs may be modified to suit specific beads, or may be left off altogether.
7. Trim tolerances:

Hole Diameter	OD Trim Tolerances
0-1.00"	±.010"
1.01 - 3.00"	±.015"
over 3.00"	±.020"

8. Dimensions and tolerances pertain to Bellofram Rolling Diaphragms as manufactured and not to dimensions and tolerances of mating parts.

DIAPHRAGM APPLICATIONS

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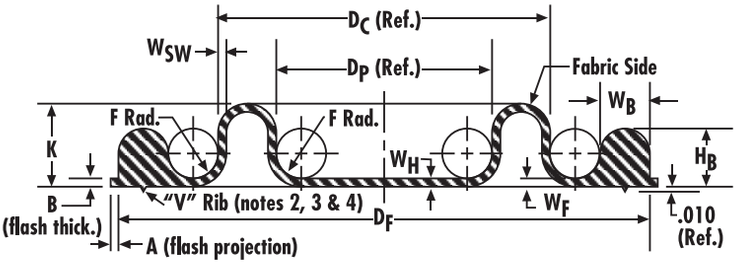
CLASS **3C** DIAPHRAGMS

Similar to the Class 3, except the convolution is molded in. Since this diaphragm is made in the "as-installed" shape with a permanent convolution, it does not require inversion at assembly. A small centering force returns the diaphragm to its neutral plane position.

DIMENSIONS AND TOLERANCES

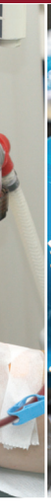
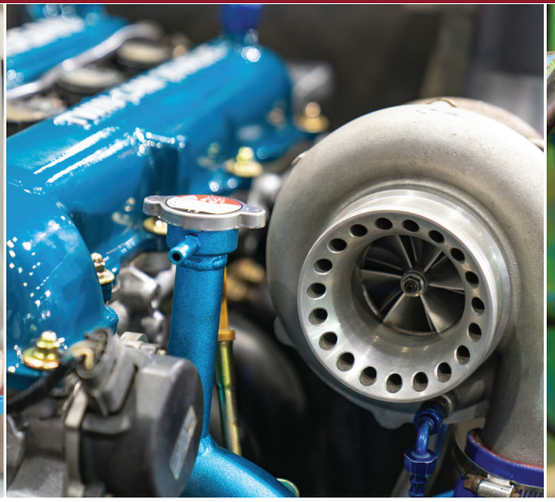


D	.37 to .99	1.00 to 2.50	2.51 to 4.00	4.01 to 8.00	8.01 and up
K	As required to yield design stroke (See standard size tables and Note 1 below.)				
DC DP	Tolerances on DC and DP are ± .010" per inch of diameter but the tolerance will be no less than ±.010" or greater than ±.060"				
WH & WF	.020 ± .003	.020 ± .004	.030 ± .004	.035 ± .005	.045 ± .007
WSW	.015 ± .003 (Code "B")	.017 ± .003 (Code "C")	.024 ± .004 (Code "D")	.035 ± .005 (Code "F")	.045 ± .007 (Code "H")
A	.025 Max.	.025 Max.	.035 Max.	.040 Max.	.056 Max.
B	.025 Max.	.025 Max.	.035 Max.	.040 Max.	.056 Max.
F	1/32 R.	1/16 R.	3/32 R.	1/8 R.	1/8 R.
DF	DC + 5/16"	DC + 1/2"	DC + 3/4"	DC + 1"	DC + 1"
WB	.093 ± .003	.125 ± .003	.187 ± .003	.250 ± .003	.250 ± .004
HB	.094 ± .004	.135 ± .004	.200 ± .005	.270 ± .006	.270 ± .008

NOTES:
1. Height tolerance is ±.015"
2. This "V" rib is for diaphragm processing only and it may not appear on all diaphragms. It is not functional and need not be completely filled. Rib is normally on rubber side of diaphragm.
3. Two "V" ribs may be used on beads that are .25 or larger in width.
4. Number, size, spacing and location of "V" ribs may be modified to suit specific beads, or may be left off altogether.
5. Trim tolerances

Hole Diameter	OD Trim Tolerances
0-1.00"	±.010"
1.01-3.00"	±.015"
over 3.01"	±.020"

6. Dimensions and tolerances pertain to Bellofram Rolling Diaphragms as manufactured and not to dimensions and tolerances of mating parts.

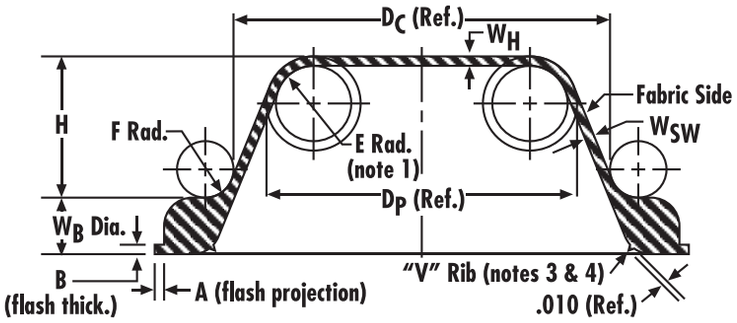



CLASS **1A** DIAPHRAGMS

The Class 1A Bellofram Rolling Diaphragm includes an O-ring type bead around the entire circumference of its mounting edge. It is designed for installations requiring minimum outside flange diameter.

This construction eliminates the need for wide flanges and, in some cases, also eliminates the need for flange bolts or flange studs. It requires no perforations or bolt holes through the flange of the diaphragm.

DIMENSIONS AND TOLERANCES



D_C	1.00 to 2.50	2.51 to 4.00	4.01 to 8.00	8.01 and up
H	As required to yield design stroke (See standard size tables and Note 2 below.)			
D_C D_P	Tolerances on DC and DP are ± .010" per inch of diameter but the tolerance will be no less than ±.010" or greater than ±.060"			
W_H	.020 ± .005	.030 ± .005	.035 ± .005	.045 ± .007
W_{SW}	.017 ± .003 (Code "C")	.024 ± .004 (Code "D")	.035 ± .005 (Code "F")	.045 ± .007 (Code "H")
A	.025 Max.	.035 Max.	.040 Max.	.056 Max.
B	.025 Max.	.035 Max.	.040 Max.	.056 Max.
E	1/16 R.	3/32 R.	1/8 R.	1/8 R.
F	1/32 R.	3/64 R.	1/16 R.	1/16 R.
W_B Dia.	.121 ± .005	.151 ± .005	.242 ± .010	.242 ± .010

1. This radius is not the piston radius since the head corner will be inverted at assembly.
2. Height should not exceed the bore (DC). Tolerance on height to be no less than ±.015" per inch of height.
3. This "V" rib is for diaphragm processing only. It may not appear on all diaphragms. It is not functional and need not be completely filled. Rib is normally on rubber side of diaphragm.
4. Number, size, spacing and location of "V" ribs may be modified to suit specific beads, or may be left off altogether.
5. Trim tolerances

Hole Diameter	OD Trim Tolerances
0-1.00"	±.010"
1.01-3.00"	±.015"
over 3.01"	±.020"

6. Dimensions and tolerances pertain to Bellofram Rolling Diaphragms as manufactured and not to dimensions and tolerances of mating parts.

DIAPHRAGM APPLICATIONS

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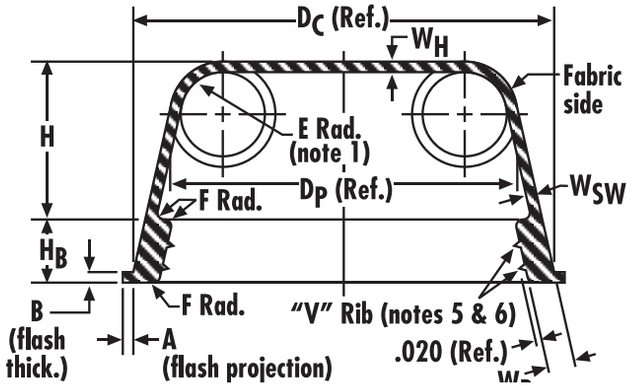
CLASS **1B** DIAPHRAGMS

The Class 1B design utilizes a rectangular-shaped bead around the entire circumference of its mounting edge, allowing the flange bead to be clamped inside the cylinder bore. This design offers a minimum outside housing diameter that is slightly larger than the diaphragm cylinder bore.

In some cases, this design eliminates the need for flange bolts or flange studs. It requires no bolt holes or perforations through the flange of the diaphragm.

DIMENSIONS AND TOLERANCES

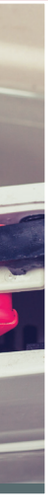


D_C	1.00 to 2.50	2.51 to 4.00	4.01 to 8.00	8.01 and up
H	As required to yield design stroke (See standard size tables and Note 2 below.)			
D_C D_P	Tolerances on DC and DP are ± .010" per inch of diameter but the tolerance will be no less than ± .010" or greater than ±.060"			
W_H	.020 ± .005	.030 ± .005	.035 ± .005	.045 ± .007
W_{SW}	.017 ± .003 (Code "C")	.024 ± .004 (Code "D")	.035 ± .005 (Code "F")	.045 ± .007 (Code "H")
A	.025 Max	.035 Max.	.040 Max.	.056 Max.
B	.025 Max.	.035 Max.	.040 Max.	.056 Max.
E	1/16 R.	3/32 R.	1/8 R.	1/8 R.
F	1/32 R.	3/64 R.	1/16 R.	1/16 R.
W_B	.080 ± .003	.100 ± .003 See note 3	.120 ± .003 See note 3	.160 ± .003 See note 3
H_B	.150 ± .005	.200 ± .005	.260 ± .005	.300 ± .005

1. This radius is not the piston radius since the head corner will be inverted at assembly
2. Height should not exceed the bore (DC). Tolerance on height to be no less than ±.015" per inch of height.
3. This tolerance does not include sidewall variation
4. Trim tolerances

Hole Diameter	OD Trim Tolerances
0-1.00"	±.010"
1.01-3.00"	±.015"
over 3.01"	±.020"

5. This "V" rib is for diaphragm processing only. It may not appear on all diaphragms. It is not functional and need not be completely filled. Rib is normally on rubber side of diaphragm.
6. Number, size, spacing and location of "V" ribs may be modified to suit specific beads, or may be left off altogether.
7. Dimensions and tolerances pertain to Bellofram Rolling Diaphragms as manufactured and not to dimensions and tolerances of mating parts.

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