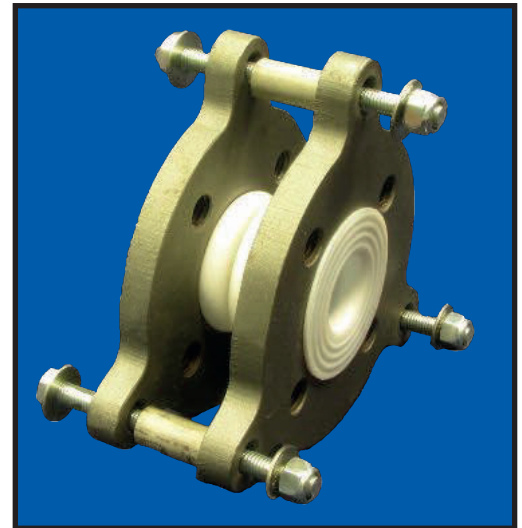
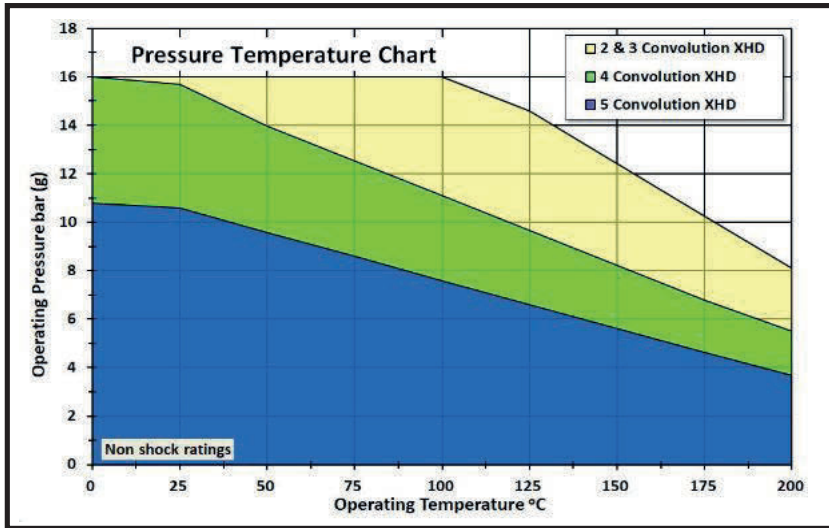


FluoroFlow FFB PTFE Bellows are manufactured from virgin paste extruded HiPerFlon® PTFE. FluoroFlow Bellows are manufactured using a unique process which ensures a uniform PTFE wall thickness and eliminates stress in the PTFE from the convolution process. This product is available with an Extra Heavy Duty “XHD” liner.



Dimensions and Movements¹

Convolutions ⁴	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral +/- [mm]	Angular +/- [degrees]	Weight [kg]
FFB 2	43	36	50	4	6	2
FFB 3	54	43	65	6	10	2
FFB 4	65	50	80	8	13	2
FFB 5	76	57	95	10	17	2

Materials

Component	Materials
Bellows	Paste Extruded Virgin PTFE to ASTM D4895
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁶	Paste Extruded Static-Dissipating PTFE to ASTM D4895
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel

Notes:

- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flange holes are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size is 10.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

Spring Rate² @ 20°C +/- 50%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
90	54	108	1.5
60	36	72	1.0
46	28	54	0.7
36	22	43	0.6

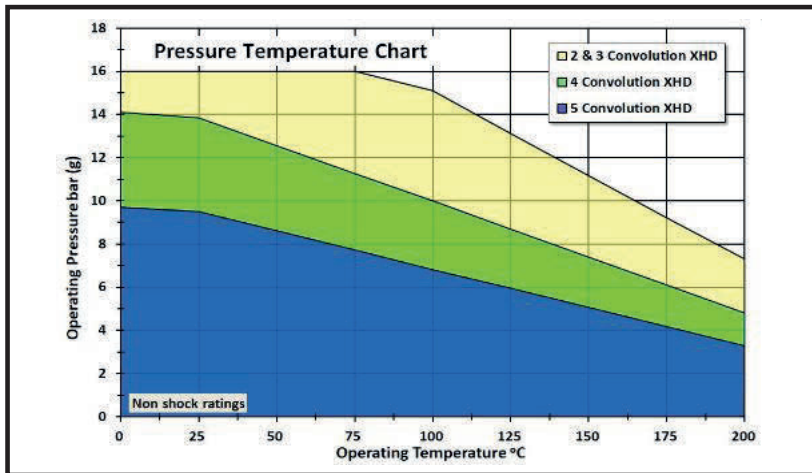
Flanges

	ASME Class 150	DIN PN10/16
Raised Face Ø [mm]	51	68
Bolt Circle Ø [mm]	79	85
Flange Max Ø [mm]	167	
Holes ³ [No. x Thread]	4 x ½" UNC	4 x M12
Thickness [mm]	12	
Effective Area [mm²]	1,000	

Vacuum

Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)	200°C bar (g)
FFB 2 XHD	-1.0	-1.0	-1.0	-1.0
FFB 3 XHD	-1.0	-1.0	-1.0	-1.0
FFB 4 XHD	-1.0	-1.0	-1.0	-1.0
FFB 5 XHD	-1.0	-1.0	-1.0	-1.0

FluoroFlow FFB PTFE Bellows are manufactured from virgin paste extruded HiPerFlon® PTFE. FluoroFlow Bellows are manufactured using a unique process which ensures a uniform PTFE wall thickness and eliminates stress in the PTFE from the convolution process. This product is available with an Extra Heavy Duty "XHD" liner.



Dimensions and Movements²

Convolutions ⁵	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral [mm]	Angular [degrees]	Weight [kg]
FFB 2	54	46	62	4	6	4
FFB 3	69	56	82	6	10	4
FFB 4	84	66	102	8	13	4
FFB 5	99	76	122	12	17	4

Spring Rate³ @ 20°C +/- 50%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
144	90	191	3.3
96	60	128	2.2
72	46	96	1.6
58	36	77	1.3

Materials

Component	Materials
Bellows	Paste Extruded Virgin PTFE to ASTM D4895
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁷	Paste Extruded Static-Dissipating PTFE to ASTM D4895
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel

Flanges

	DIN PN10/16
Raised Face ø [mm]	84
Bolt Circle ø [mm]	100
Flange Max ø [mm]	204
Holes [No. x Thread]	4 x M16
Thickness [mm]	16
Effective Area [mm²]	2200

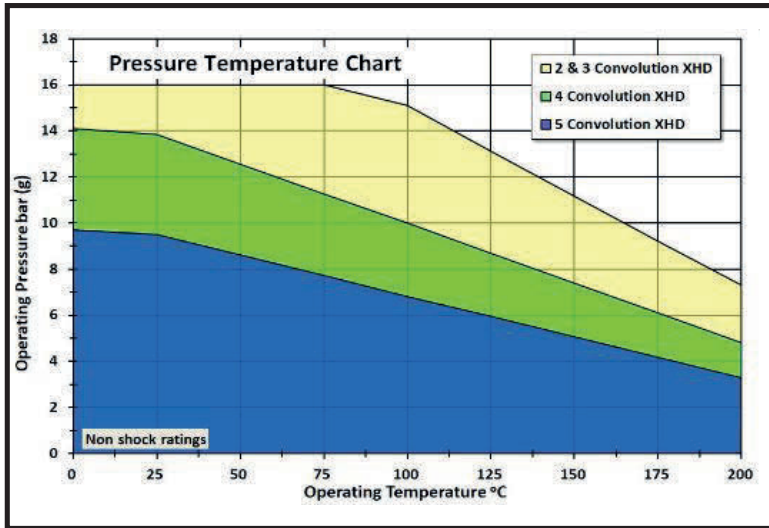
Vacuum

Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)	200°C bar (g)
FFB 2 XHD	-1.0	-1.0	-1.0	-1.0
FFB 3 XHD	-1.0	-1.0	-1.0	-1.0
FFB 4 XHD	-1.0	-1.0	-1.0	-1.0
FFB 5 XHD	-1.0	-1.0	-1.0	-1.0

Notes:

- Size 1.1/4" FFAB bellows are also available with flange bolt holes to suit ASME 150 flanged piping systems.
- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flanges are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size 10.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

FluoroFlow FFB PTFE Bellows are manufactured from virgin paste extruded HiPerFlon® PTFE. FluoroFlow Bellows are manufactured using a unique process which ensures a uniform PTFE wall thickness and eliminates stress in the PTFE from the convolution process. This product is available with an Extra Heavy Duty “XHD” liner.



Dimensions and Movements¹

Convolutions ⁴	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral +/- [mm]	Angular +/- [degrees]	Weight [kg]
FFB 2	54	46	62	4	6	5
FFB 3	69	56	82	6	10	5
FFB 4	84	66	102	8	13	5
FFB 5	99	76	122	12	17	5

Spring Rate² @ 20°C +/- 50%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
144	90	191	3.3
96	60	128	2.2
72	46	96	1.6
58	36	77	1.3

Materials

Component	Materials
Bellows	Paste Extruded Virgin PTFE to ASTM D4895
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁶	Paste Extruded Static-Dissipating PTFE to ASTM D4895
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel

Flanges

	ASME Class 150	DIN PN10/16
Raised Face Ø [mm]	73	88
Bolt Circle Ø [mm]	98	110
Flange Max Ø [mm]	204	
Holes ³ [No. x Thread]	4 x ½" UNC	4 x M16
Thickness [mm]	16	
Effective Area [mm²]	2,200	

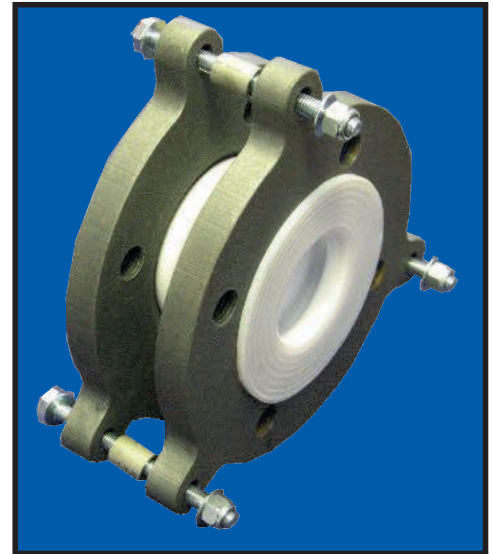
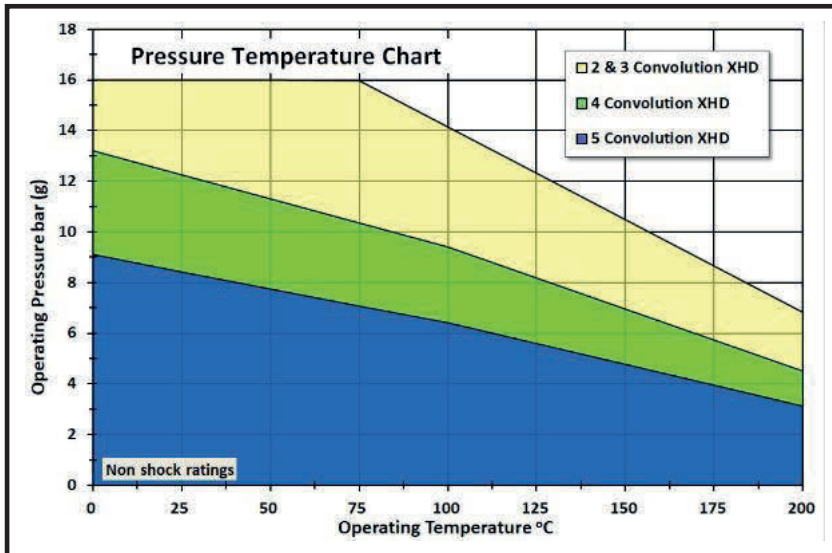
Vacuum

Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)	200°C bar (g)
FFB 2 XHD	-1.0	-1.0	-1.0	-1.0
FFB 3 XHD	-1.0	-1.0	-1.0	-1.0
FFB 4 XHD	-1.0	-1.0	-1.0	-1.0
FFB 5 XHD	-1.0	-1.0	-1.0	-1.0

Notes:

- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flange holes are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size is 10.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

FluoroFlow FFB PTFE Bellows are manufactured from virgin paste extruded HiPerFlon® PTFE. FluoroFlow Bellows are manufactured using a unique process which ensures a uniform PTFE wall thickness and eliminates stress in the PTFE from the convolution process. This product is available with an Extra Heavy Duty “XHD” liner.



Dimensions and Movements¹

Convolutions ⁴	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral +/- [mm]	Angular +/- [degrees]	Weight [kg]
FFB 2	55	44	66	6	7	5
FFB 3	70	54	86	9	11	5
FFB 4	85	64	106	12	14	5
FFB 5	100	74	126	15	18	6

Materials

Component	Materials
Bellows	Paste Extruded Virgin PTFE to ASTM D4895
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁶	Paste Extruded Static-Dissipating PTFE to ASTM D4895
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel

Notes:

- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flange holes are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size is 10.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

Spring Rate² @ 20°C +/- 50%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
154	104	225	4.1
102	70	150	2.7
76	52	113	2.0
62	42	90	1.6

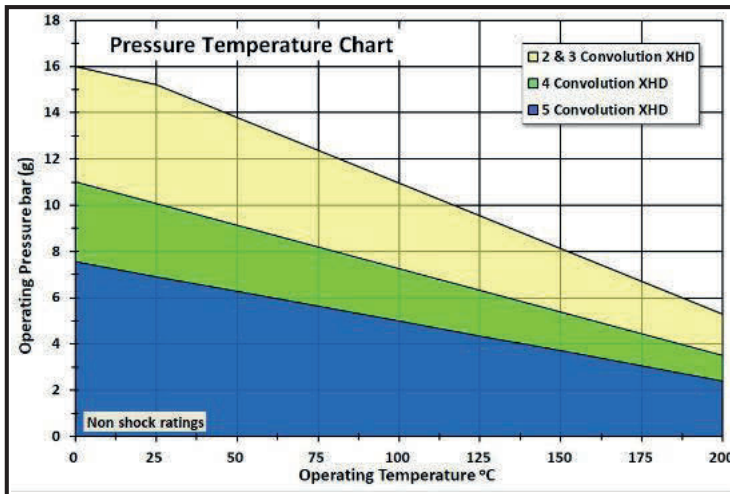
Flanges

	ASME Class 150	DIN PN10/16
Raised Face Ø [mm]	92	102
Bolt Circle Ø [mm]	121	125
Flange Max Ø [mm]	220	
Holes ³ [No. x Thread]	4 x ½" UNC	4 x M16
Thickness [mm]	16	
Effective Area [mm²]	3,200	

Vacuum

Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)	200°C bar (g)
FFB 2 XHD	-1.0	-1.0	-1.0	-1.0
FFB 3 XHD	-1.0	-1.0	-1.0	-1.0
FFB 4 XHD	-1.0	-1.0	-1.0	-1.0
FFB 5 XHD	-1.0	-1.0	-1.0	-1.0

FluoroFlow FFB PTFE Bellows are manufactured from virgin paste extruded HiPerFlon® PTFE. FluoroFlow Bellows are manufactured using a unique process which ensures a uniform PTFE wall thickness and eliminates stress in the PTFE from the convolution process. This product is available with an Extra Heavy Duty “XHD” liner.



Dimensions and Movements¹

Convolutions ⁴	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral +/- [mm]	Angular +/- [degrees]	Weight [kg]
FFB 2	65	54	76	6	7	6
FFB 3	85	69	101	9	10	6
FFB 4	105	84	126	12	13	7
FFB 5	125	99	151	15	16	7

Materials

Component	Materials
Bellows	Paste Extruded Virgin PTFE to ASTM D4895
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁶	Paste Extruded Static-Dissipating PTFE to ASTM D4895
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel

Notes:

- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flange holes are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size is 10.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

Spring Rate² @ 20°C +/- 50%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
190	144	293	5.9
126	96	195	3.9
94	72	146	2.9
76	58	117	2.3

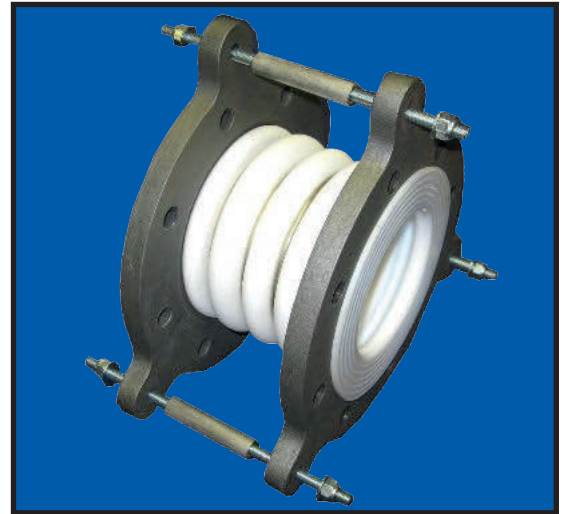
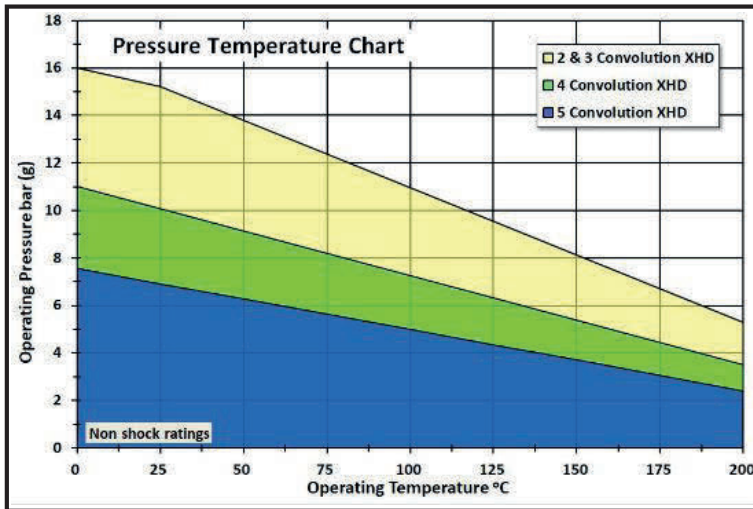
Flanges

	ASME Class 150	DIN PN10/16
Raised Face Ø [mm]	105	122
Bolt Circle Ø [mm]	140	145
Flange Max Ø [mm]	240	
Holes ³ [No. x Thread]	4 x ½" UNC	8 x M16
Thickness [mm]	16	
Effective Area [mm²]	5,200	

Vacuum

Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)	200°C bar (g)
FFB 2 XHD	-1.0	-1.0	-1.0	-1.0
FFB 3 XHD	-1.0	-1.0	-1.0	-1.0
FFB 4 XHD	-1.0	-1.0	-1.0	-1.0
FFB 5 XHD	-1.0	-1.0	-1.0	-1.0

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Dimensions and Movements¹

Convolutions ⁴	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral +/- [mm]	Angular +/- [degrees]	Weight [kg]
FFB 2	65	52	78	7	7	7
FFB 3	85	66	104	11	11	8
FFB 4	105	81	129	15	14	8
FFB 5	125	95	155	19	18	8

Materials

Component	Materials
Bellows	Paste Extruded Virgin PTFE to ASTM D4895
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁶	Paste Extruded Static-Dissipating PTFE to ASTM D4895
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel

Spring Rate² @ 20°C +/- 50%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
256	166	360	7.3
172	112	240	4.9
128	84	180	3.7
102	66	144	2.9

Flanges

	ASME Class 150	DIN PN10/16
Raised Face Ø [mm]	127	138
Bolt Circle Ø [mm]	152	160
Flange Max Ø [mm]	260	
Holes ³ [No. x Thread]	4 x ¾" UNC	8 x M16
Thickness [mm]	16	
Effective Area [mm ²]	7,300	

Vacuum

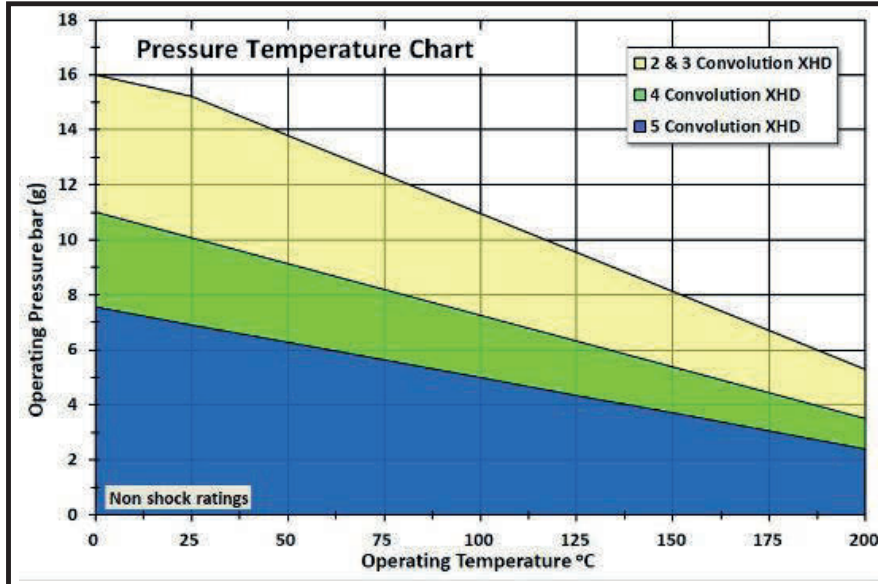
Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)	200°C bar (g)
FFB 2 XHD	-1.0	-1.0	-1.0	-1.0
FFB 3 XHD	-1.0	-1.0	-1.0	-1.0
FFB 4 XHD	-1.0	-1.0	-1.0	-1.0
FFB 5 XHD	-1.0	-1.0	-1.0	-1.0

Notes:

- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flange holes are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size is 10.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

FluoroFlow FFB PTFE Bellows are manufactured from virgin paste extruded HiPerFlon® PTFE. FluoroFlow Bellows are manufactured using a unique process which ensures a uniform PTFE wall thickness and eliminates stress in the PTFE from the convolution process. This product is available with an Extra Heavy Duty “XHD” liner.

Notes



Dimensions and Movements¹

Convolutions ⁴	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral +/- [mm]	Angular +/- [degrees]	Weight [kg]
FFB 2	67	52	82	8	7	10
FFB 3	91	70	112	12	10	10
FFB 4	115	88	142	16	13	10
FFB 5	139	106	172	20	17	10

Materials

Component	Materials
Bellows	Paste Extruded Virgin PTFE to ASTM D4895
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁶	Paste Extruded Static-Dissipating PTFE to ASTM D4895
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel

Spring Rate² @ 20°C +/- 50%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
400	248	450	9.9
268	166	300	6.6
200	124	225	5.0
160	100	180	4.0

Flanges

	ASME Class 150	DIN PN10/16
Raised Face Ø [mm]	157	158
Bolt Circle Ø [mm]	191	180
Flange Max Ø [mm]	308	
Holes ³ [No. x Thread]	8 x ½" UNC	8 x M16
Thickness [mm]	16	
Effective Area [mm²]	10,200	

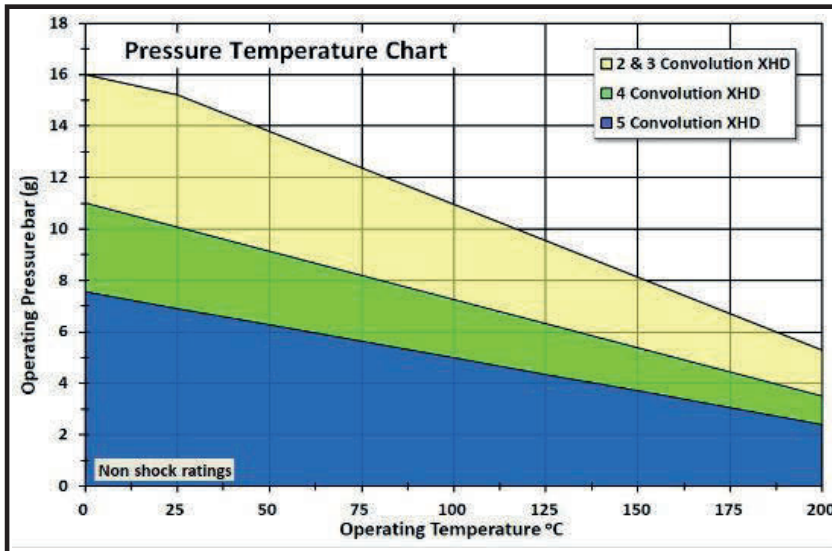
Vacuum

Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)	200°C bar (g)
FFB 2 XHD	-1.0	-1.0	-1.0	-1.0
FFB 3 XHD	-1.0	-1.0	-1.0	-1.0
FFB 4 XHD	-1.0	-1.0	-1.0	-1.0
FFB 5 XHD	-1.0	-1.0	-1.0	-1.0

Notes:

- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flange holes are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size is 10.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

FluoroFlow FFB PTFE Bellows are manufactured from virgin paste extruded HiPerFlon® PTFE. FluoroFlow Bellows are manufactured using a unique process which ensures a uniform PTFE wall thickness and eliminates stress in the PTFE from the convolution process. This product is available with an Extra Heavy Duty “XHD” liner.



Dimensions and Movements¹

Convolutions ⁴	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral +/- [mm]	Angular +/- [degrees]	Weight [kg]
FFB 2	75	60	90	8	6	12
FFB 3	103	82	124	12	9	13
FFB 4	131	103	159	16	12	13
FFB 5	159	125	193	20	15	13

Materials

Component	Materials
Bellows	Paste Extruded Virgin PTFE to ASTM D4895
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁶	Paste Extruded Static-Dissipating PTFE to ASTM D4895
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel

Notes:

- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flange holes are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size is 10.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

Spring Rate² @ 20°C +/- 50%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
442	288	563	13.5
294	192	375	9.0
220	144	281	6.8
176	116	225	5.4

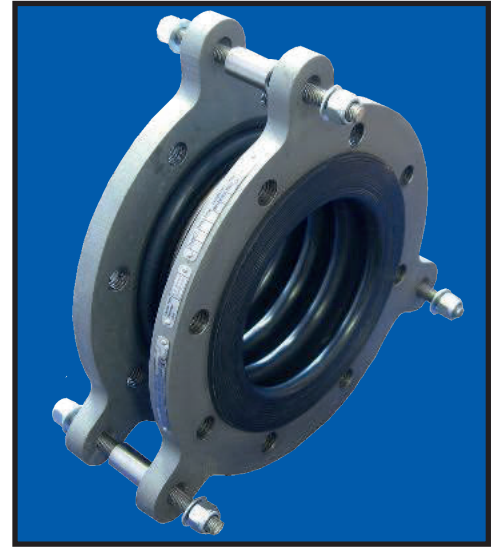
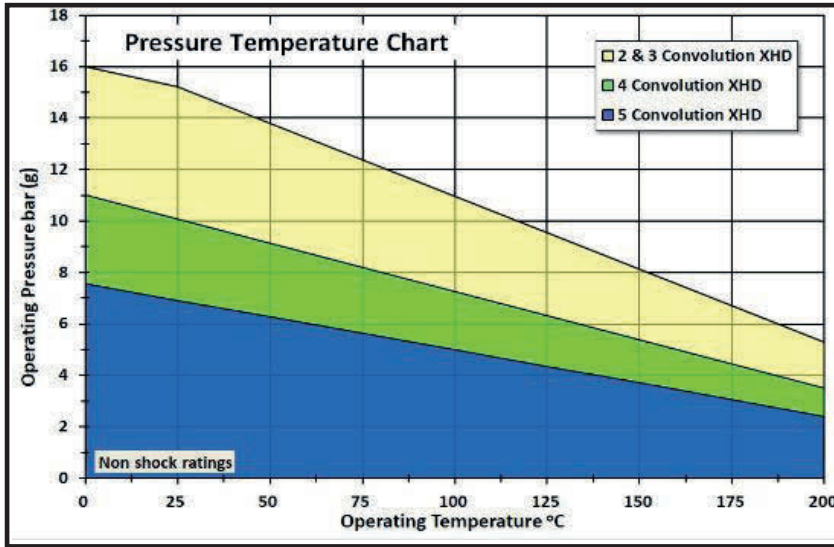
Flanges

	ASME Class 150	DIN PN10/16
Raised Face Ø [mm]	186	188
Bolt Circle Ø [mm]	216	210
Flange Max Ø [mm]	333	
Holes ³ [No. x Thread]	8 x ¾" UNC	8 x M16
Thickness [mm]	20	
Effective Area [mm²]	17,300	

Vacuum

Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)	200°C bar (g)
FFB 2 XHD	-1.0	-1.0	-1.0	-1.0
FFB 3 XHD	-1.0	-1.0	-1.0	-1.0
FFB 4 XHD	-1.0	-1.0	-1.0	-1.0
FFB 5 XHD	-1.0	-1.0	-1.0	-1.0

FluoroFlow FFB PTFE Bellows are manufactured from virgin paste extruded HiPerFlon® PTFE. FluoroFlow Bellows are manufactured using a unique process which ensures a uniform PTFE wall thickness and eliminates stress in the PTFE from the convolution process. This product is available with an Extra Heavy Duty “XHD” liner.



Dimensions and Movements¹

Convolutions ⁴	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral +/- [mm]	Angular +/- [degrees]	Weight [kg]
FFB 2	75	59	91	8	6	15
FFB 3	103	81	125	12	8	15
FFB 4	131	102	160	17	11	16
FFB 5	159	124	194	21	14	16

Materials

Component	Materials
Bellows	Paste Extruded Virgin PTFE to ASTM D4895
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁶	Paste Extruded Static-Dissipating PTFE to ASTM D4895
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel

Notes:

- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flange holes are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size is 10.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

Spring Rate² @ 20°C +/- 50%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
496	306	675	16.4
330	204	450	11.0
248	154	338	8.2
198	122	270	6.6

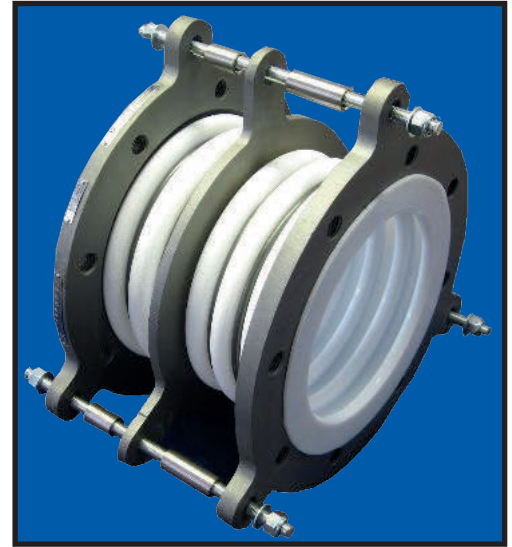
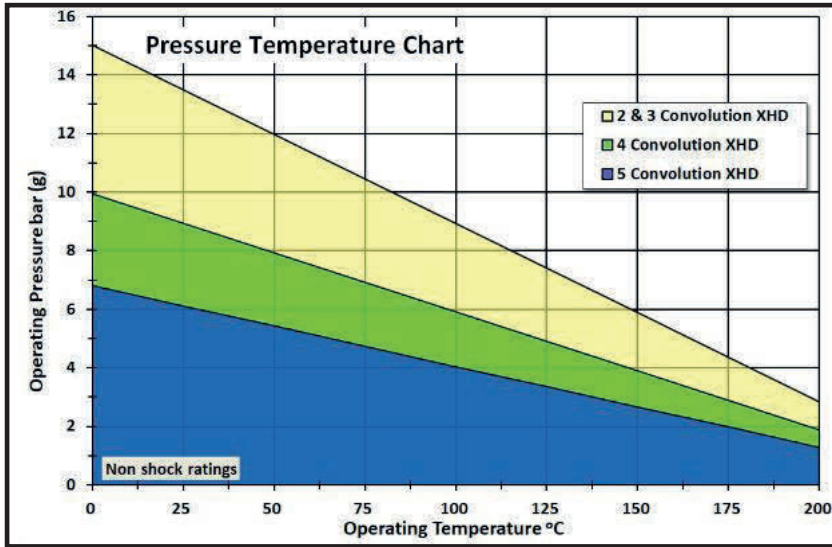
Flanges

	ASME Class 150	DIN PN10/16
Raised Face Ø [mm]	216	212
Bolt Circle Ø [mm]	241	240
Flange Max Ø [mm]	378	
Holes ³ [No. x Thread]	8 x ¾" UNC	8 x M16
Thickness [mm]	20	
Effective Area [mm ²]	20,900	

Vacuum

Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)	200°C bar (g)
FFB 2 XHD	-1.0	-1.0	-1.0	-1.0
FFB 3 XHD	-1.0	-1.0	-1.0	-1.0
FFB 4 XHD	-1.0	-1.0	-1.0	-1.0
FFB 5 XHD	-1.0	-1.0	-1.0	-1.0

FluoroFlow FFB PTFE Bellows are manufactured from virgin paste extruded HiPerFlon® PTFE. FluoroFlow Bellows are manufactured using a unique process which ensures a uniform PTFE wall thickness and eliminates stress in the PTFE from the convolution process. This product is available with an Extra Heavy Duty "XHD" liner.



Dimensions and Movements¹

Convolutions ⁴	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral +/- [mm]	Angular +/- [degrees]	Weight [kg]
FFB 2	75	58	92	8	5	20
FFB 3	103	79	127	12	8	20
FFB 4	131	100	162	17	10	21
FFB 5	159	121	197	21	12	21

Materials

Component	Materials
Bellows	Paste Extruded Virgin PTFE to ASTM D4895
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁷	Paste Extruded Static-Dissipating PTFE to ASTM D4895
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel
Vacuum Support Rings	Hastelloy, Titanium, Tantalum, PTFE Encapsulated etc.

Notes:

- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flange holes are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size is 10.
- Vacuum performance can increase to full vacuum with the use of vacuum support rings.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

Spring Rate² @ 20°C +/- 30%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
390	300	885	18.3
260	200	590	12.2
195	150	443	9.1
156	100	354	7.3

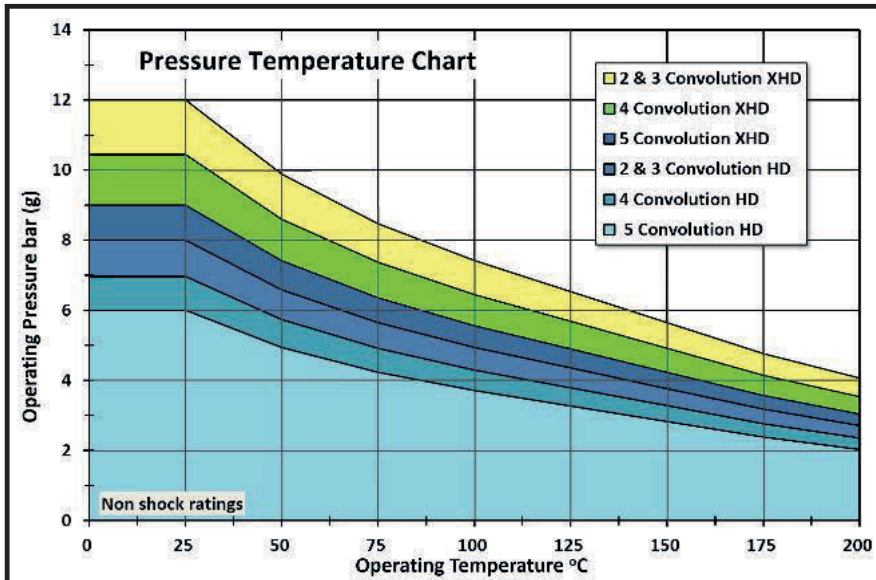
Flanges

	ASME Class 150	DIN PN10	DIN PN16
Raised Face Ø [mm]	270	268	
Bolt Circle Ø [mm]	298	295	335
Flange Max Ø [mm]	440		
Holes ³ [No. x Thread]	8 x ¾" UNC	8 x M20	12 x M20
Thickness [mm]	20		
Effective Area [mm ²]	35,300		

Vacuum

Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)	200°C bar (g)
FFB 2 XHD	-1.0	-1.0	-1.0	-1.0
FFB 3 XHD	-1.0	-1.0	-1.0	-1.0
FFB 4 XHD ⁵	-1.0	-0.9	-0.8	-0.7
FFB 5 XHD	-0.9	-0.8	-0.7	-0.6

FluoroFlow FFB PTFE Bellows are manufactured from virgin multi-ply HiPerFlon® PTFE. FluoroFlow Bellows are manufactured using a unique process which ensures a uniform PTFE wall thickness and eliminates stress in the PTFE from the convolution process. This product is available in two liner thicknesses, our standard Heavy Duty “HD” and an Extra Heavy Duty “XHD”.



Dimensions and Movements¹

Convolutions ⁴	Neutral Length [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral +/- [mm]	Angular +/- [degrees]	Weight [kg]
FFB 2	78	59	97	8	5	25
FFB 3	107	81	133	12	7	26
FFB 4	135	103	167	17	9	26
FFB 5	164	125	203	21	11	27

Spring Rate² @ 20°C +/- 30%

Axial Compression [N/mm]	Axial Extension [N/mm]	Lateral [N/mm]	Angular [Nm/°]
420	330	840	25.9
280	220	560	17.3
210	165	420	12.9
168	132	336	10.4

Materials

Component	Materials
Bellows	Multi-ply Virgin PTFE to ASTM D4894 Type IV
Flanges	Carbon Steel to BS1501-161-430A / S235JRG2 (RSt 37.2)
Paint	Ultra-High Temperature in Silver
Root Rings	Stainless Steel to 320S31 (316Ti)
Tie Rods	Carbon Steel Grade 8.8 Zinc Plated
Nuts	Carbon Steel Grade 8.8 Zinc Plated
Limit Sleeves	Stainless Steel to ASTM A312 Gr. 304/304L

Options

Bellows ⁷	Multi-ply Static-Dissipating PTFE to ASTM D4894 Type IV
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Root Rings	Hastelloy, Monel etc.
Tie Rods	Stainless Steel, Hastelloy, Monel etc.
Anti-Snake Rings	Stainless Steel
Vacuum Support Rings	Hastelloy, Titanium, Tantalum, PTFE Encapsulated etc.

Flanges

	ASME Class 150	DIN PN10	DIN PN16
Raised Face Ø [mm]	324	320	
Bolt Circle Ø [mm]	362	350	355
Flange Max Ø [mm]	514		
Holes ³ [No. x Thread]	12 x ¾" UNC	12 x M20	12 x M24
Thickness [mm]	20		
Effective Area [mm ²]	56,600		

Vacuum

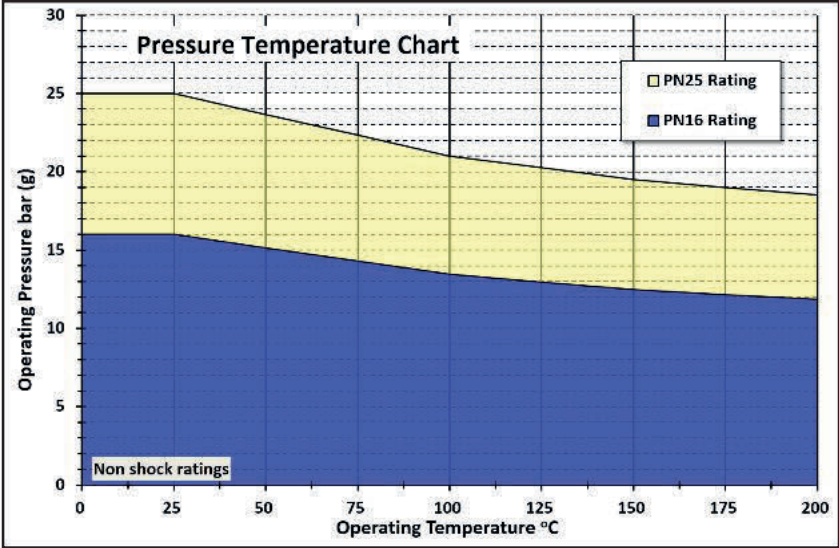
Convolutions	20°C bar (g)	100°C bar (g)	150°C bar (g)
FFB 2 HD	-1.0	-1.0	0.0
FFB 3 HD	-1.0	-1.0	0.0
FFB 2 XHD	-1.0	-1.0	-1.0
FFB 3 XHD ⁵	-1.0	-1.0	-0.75

Notes:

- Larger movements are available with more convolutions if required. These are not independent movements. For combined movements please consult us.
- Please see page 3 for temperature correction factors for spring rate.
- As standard flange holes are threaded. Clearance holes and alternative threads are possible for certain sizes please contact us.
- The maximum number of convolutions for this size is 10.
- For vacuum performance above 3 convolutions please consult us. Vacuum performance can increase to full vacuum with the use of vacuum support rings.
- For operating temperature and pressure for more than 5 convolutions please contact us.
- Static-Dissipating Bellows have the same working pressure / temperature range as Virgin PTFE Bellows.

Armoured FluoroFlow FFAB PTFE Bellows are manufactured from virgin HiPerFlon® PTFE and combined with a multi-layered austenitic stainless steel shell to provide high pressure performance outside the range of conventional PTFE bellows. This range is designed to the EJMA international standard.

The manufacturing technique is such that the PTFE and the steel shell are convoluted simultaneously to provide a uniform PTFE wall thickness throughout the product.



Materials	
Component	Materials
Bellows Liner	Paste Extruded Virgin PTFE to ASTM D4895 or Multi-ply Virgin PTFE to ASTM D4894 Type IV
Bellows Shell	Stainless Steel to 321S31 / 321 / 1.4541
Flanges	Carbon Steel to S235JRG2 / RSt 37.2
Paint—on CS Flanges	Zinc Epoxy Primer in Grey
Options	
Bellows Liner	Paste Extruded Static-Dissipating PTFE to ASTM D4895 or Multi-ply Static-Dissipating PTFE to ASTM D4894 Type IV
Bellows Shell ¹	Hastelloy and other Exotic Materials
Flanges	Stainless Steel, Hastelloy, Low Temperature Steels etc.
Flanges	Threaded holes
Tie Rods ²	Available as an option—not supplied as standard product



- Notes:
- 1. Please note that hastelloy is available for areas subject to stainless steel stress corrosion cracking such as HCl service.
 - 2. Tie rods are not provided with the standard product, but these are available as an option.

Note that as standard flanges are rotating. Also tie rods are not supplied as part of the standard product, they are an option.

Dimensions, Movements and Vacuum Performance																
NB	DN	Ambient Rating bar (g)	Flange Type		Neutral Length ¹ [mm]	Minimum Length [mm]	Maximum Length [mm]	Lateral ² [mm]	Angular [degrees]	Weight DIN [kg]	Weight ASME [kg]	Spring Rate [N/mm] ± 30%	Effective Area [m ²]	Vacuum		
			ASME Class	DIN PN										20°C bar (g)	100°C bar (g)	180°C bar (g)
1.1/2 in	40	16	150	16	130	121	139	1	3	5	3	183	0.00278	-1.0	-1.0	-1.0
					225	210	240			5	3	138	0.00272			
		25	300	25	260	246	274			6	7	265	0.00262			
2 in	50	16	150	16	125	116	134			6	5	185	0.00422			
					215	200	230			6	5	145	0.00415			
		25	300	25	240	225	255			8	8	276	0.00401			
2.1/2 in	65	16	150	16	135	126	144		7	7	200	0.00590				
					215	197	233		8	8	214	0.00570				
		25	300	25	230	214	246		10	12	274	0.00566				
3 in	80	16	150	16	130	120	140		7	8	216	0.00851				
					220	201	239		9	10	202	0.00840				
		25	300	25	225	209	241		12	15	245	0.00831				
4 in	100	16	150	16	160	150	170		10	12	300	0.01383				
					260	239	281		11	13	179	0.01370				
		25	300	25	220	203	237		17	25	280	0.01358				
5 in	125	16	150	16	175	164	186		12	14	390	0.02008				
					270	247	293		14	16	237	0.01990				
		25	300	25	300	280	32		28	35	356	0.01963				
6 in	150	16	150	16	165	154	176		16	17	530	0.02790				
					300	274	326		16	17	216	0.02800				
		25	300	25	295	275	315		32	43	407	0.02746				
8 in	200	16	150	16	180	168	192		23	27	707	0.04480				
					325	292	358		25	30	303	0.04455				
		25	300	25	230	217	243		40	61	750	0.04434				
10 in	250	16	150	16	200	186	214		34	38	896	0.06770				
					330	296	364		35	40	376	0.06770				
		25	300	25	330	303	357		68	92	624	0.06720				
12 in	300	16	150	16	195	1783	212		44	59	792	0.09390				
					350	310	390		46	61	338	0.09390				
		25	300	25	345	312	378		88	136	597	0.09263				
14 in	350	16	150	16	175	157	193		65	78	1026	0.11080				
					315	271	359		68	80	484	0.11080				
		25	n/a	25	315	280	350		120	n/a	661	0.10970				
			300	n/a	335	300	370		n/a	170		0.10970				
16 in	400	16	150	16	335	287	383		96	114	445	0.14370				
		25	n/a	25	330	293	367		158	n/a	859	0.14320				
			300	n/a	350	313	387		n/a	209		0.14320				
20 in	500	16	150	16	220	195	245		149	144	1067	0.21590				
		25	300	25	300	268	332		219	290	1095	0.21750				

Notes:

- Longer and shorter lengths are available providing more or less axial travel.
- More lateral and angular movement are possible, please consult us.