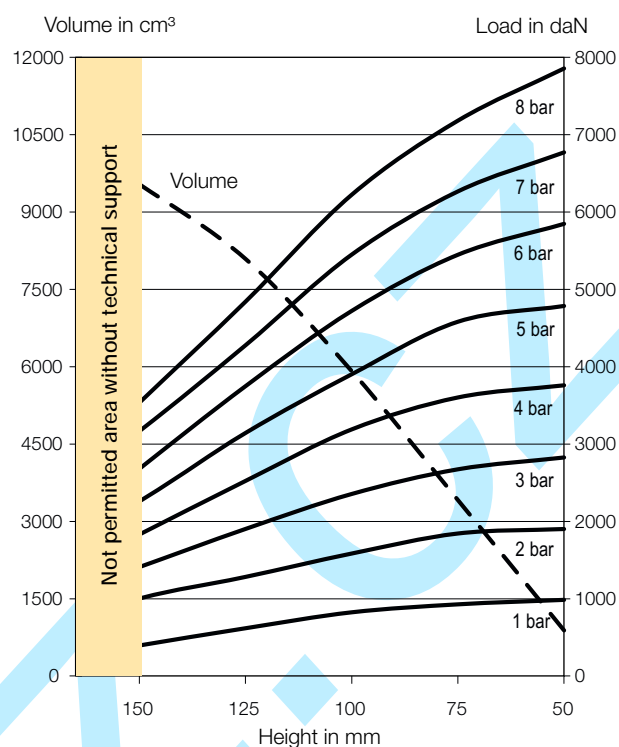
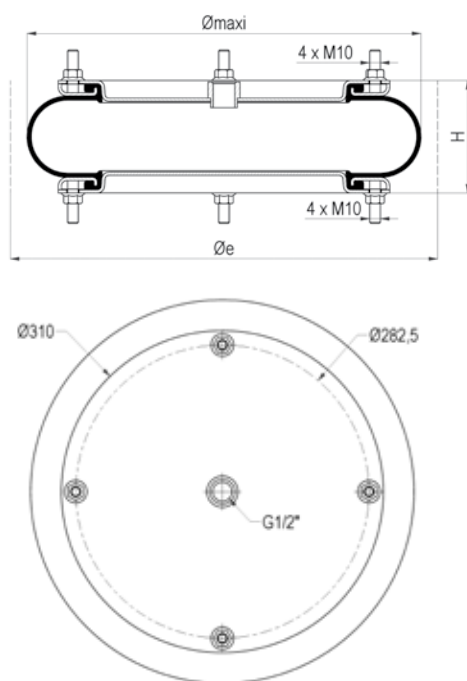


Type x Number of Convolution: **14.1/2" x 1, Ø 370**

## Adiabatic characteristic curves / Dynamic movements



## Order Code

Materials	Cups	Standard cups	Stainless steel cups
Standard temperature NR	Steel or stainless steel	<b>9 109 064</b>	<b>9 109 064N</b>
High temperature CR		<b>9 109 264</b>	<b>9 109 264N</b>
Extreme high temp. ECO		On request	On request

## Technical data

Air port inlet	G1/2"
Rec / Max pressure [bar]	5,5 / 8
Force [N] @ 0 bar to H (mm)	360 (50)
Weight [kg]	6,90

## Dimensions [mm]

Ø maxi.	395
Øe	425
H static	110
H min.	50
H max.	165
H recommended	150

## Fastening torque [Nm]

G1/2"	25 Nm
M10	25 Nm
-	-

## Dynamic characteristic values

Pressure p [bar]	2	4	6
Force (load) [kN]	1325	2635	3940
Stiffness [daN/cm]	328,0	559,0	784,0
Natural frequency [Hz]	2,5	2,3	2,2
Vol. V [cm³]	8660	8,70	9,80
H2 rec for isolation [mm]	130	130	130

## Misalignment for H between [mm]

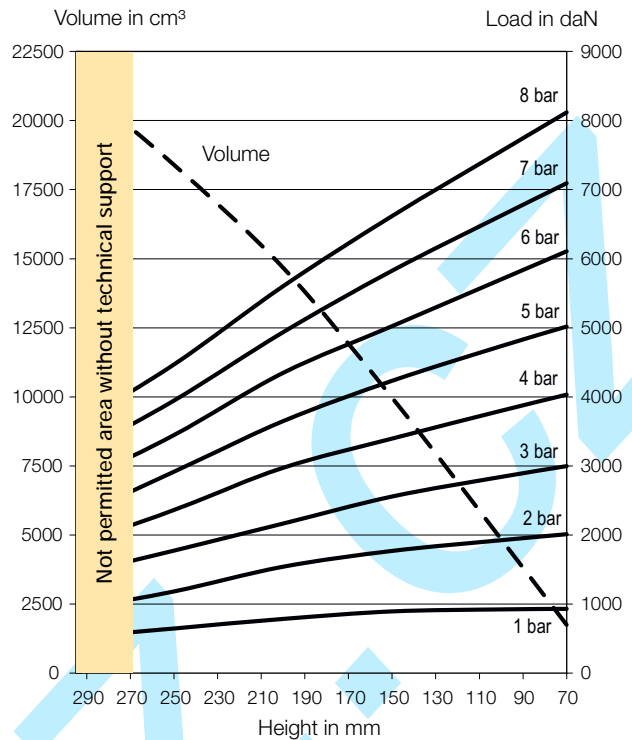
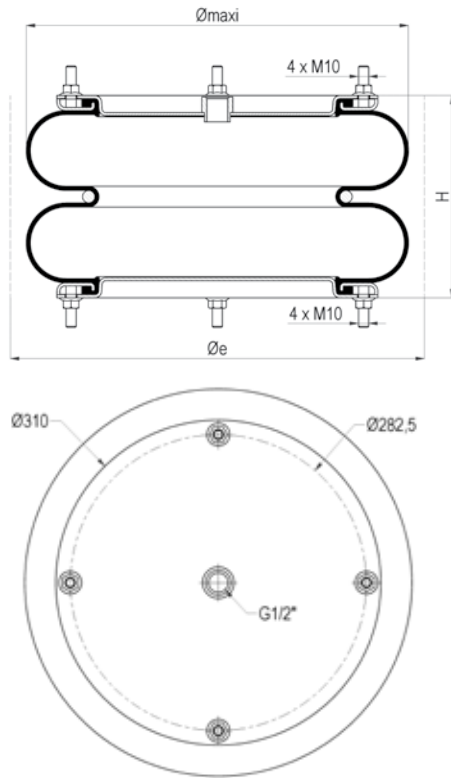
Axial	A = 5 mm	105 to 170
	A = 10 mm	85 to 160
Angular	Angle α = 5°	65 to 145
	Angle α = 10°	85 to 135
	Angle α = 15°	-

## Static characteristic values

		Force F [daN]						Vol. V [cm³]
Pressure p [bar]		3	4	5	6	7	8	
Height H [mm]	50	2826	3759	4785	5847	6771	7856	883
	75	2673	3602	4581	5447	6266	7181	3411
	100	2354	3189	3902	4721	5449	6223	5911
	125	1902	2523	3143	3748	4277	4841	8087
	150	1409	1830	2258	2679	3166	3534	9535
	165	1122	1420	1724	2018	2492	2736	10331
	-	-	-	-	-	-	-	-

Type x Number of Convolution: **14.1/2" x 2, Ø 370**

## Adiabatic characteristic curves / Dynamic movements



## Order Code

Materials	Cups	Standard cups	Stainless steel cups
Standard temperature NR	Steel or stainless steel	<b>9 109 061</b>	<b>9 109 061N</b>
High temperature CR		<b>9 109 261</b>	<b>9 109 261N</b>
Extreme high temp. ECO		On request	On request

## Technical data

Air port inlet	G1/2"
Rec / Max pressure [bar]	5,5 / 8
Force [N] @ 0 bar to H (mm)	210 (75)
Weight [kg]	9,10

## Dimensions [mm]

Ø maxi.	395
Øe	425
H static	180
H min.	70
H max.	295
H recommended	270

## Fastening torque [Nm]

G1/2"	25 Nm
M10	25 Nm
-	-

## Dynamic characteristic values

Pressure p [bar]	2	4	6
Force (load) [kN]	1185	2380	3560
Stiffness [daN/cm]	151,0	264,0	373,0
Natural frequency [Hz]	1,8	1,7	1,6
Vol. V [cm³]	17200	17800	18400
H2 rec for isolation [mm]	250	250	250

## Misalignment for H between [mm]

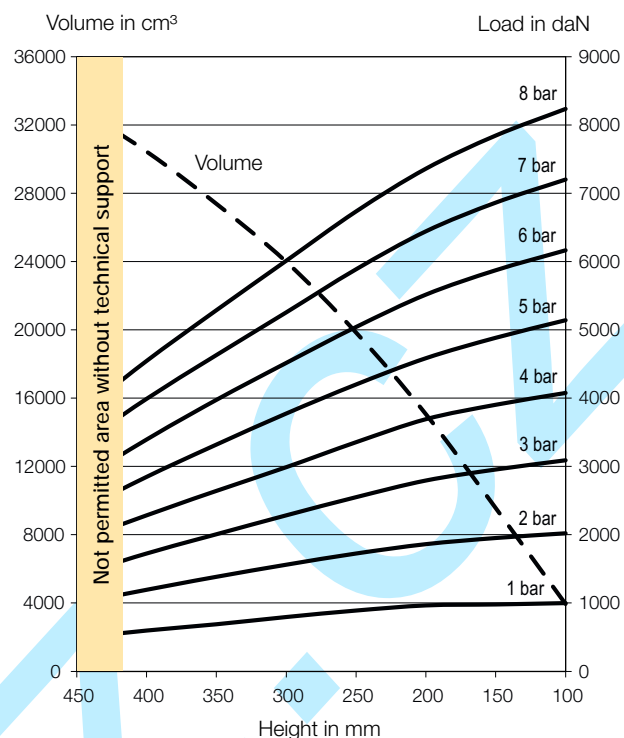
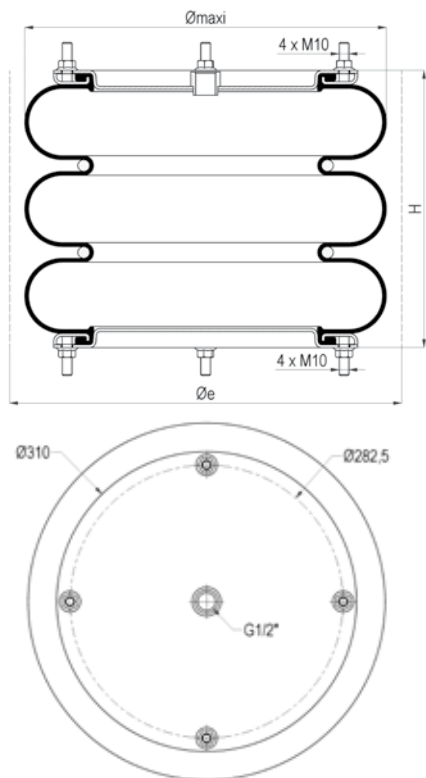
Axial	A = 5 mm	110 to 340
	A = 10 mm	120 to 330
Angular	Angle α = 5°	-
	Angle α = 10°	115 to 290
	Angle α = 15°	135 to 275

## Static characteristic values

		Force F [daN]						Vol. V [cm³]
Pressure p [bar]		3	4	5	6	7	8	
Height H [mm]	70	2996	4031	5017	6107	7093	8119	1744
	100	2840	3798	4734	5701	6624	7558	4846
	150	2556	3395	4232	5023	5826	6618	9970
	200	2164	2971	3647	4346	4935	5601	14680
	250	1772	2361	2915	3446	3945	4468	18403
	295	1421	1869	2273	2770	3167	3609	21351
-		-	-	-	-	-	-	-

Type x Number of Convolution: **14.1/2" x 3, Ø 370**

## Adiabatic characteristic curves / Dynamic movements



## Order Code

Materials	Cups	Standard cups	Stainless steel cups
Standard temperature NR	Steel or stainless steel	<b>9 109 069</b>	<b>9 109 069N</b>
High temperature CR		<b>9 109 269</b>	<b>9 109 269N</b>
Extreme high temp. ECO		On request	On request

## Technical data

Air port inlet	G1/2"
Rec / Max pressure [bar]	5,5 / 8
Force [N] @ 0 bar to H (mm)	210 (105)
Weight [kg]	10,00

## Dimensions [mm]

Ø maxi.	395
Øe	425
H static	280
H min.	100
H max.	450
H recommended	420

## Fastening torque [Nm]

G1/2"	25 Nm
M10	25 Nm
-	-

## Dynamic characteristic values

Pressure p [bar]	2	4	6
Force (load) [kN]	1110	2235	3365
Stiffness [daN/cm]	92,0	163,0	233,0
Natural frequency [Hz]	1,4	1,4	1,3
Vol. V [cm³]	26070	26970	27860
H2 rec for isolation [mm]	370	370	370

## Misalignment for H between [mm]

Axial	A = 5 mm	160 to 440
	A = 10 mm	170 to 430
Angular	Angle α = 5°	300 to 390
	Angle α = 10°	310 to 370
	Angle α = 15°	-

## Static characteristic values

		Force F [daN]						Vol. V [cm³]
Pressure p [bar]		3	4	5	6	7	8	
Height H [mm]	100	3090	4076	5141	6165	7201	8235	3945
	150	2955	3903	4884	5873	6863	7845	9562
	200	2794	3692	4585	5516	6443	7360	15064
	250	2550	3355	4200	5042	5887	6734	19847
	300	2284	2989	3775	4516	5256	6012	23992
	350	2007	2642	3320	3975	4631	5288	27388
	400	1725	2284	2847	3394	3990	4545	30449
	450	1386	1896	2317	2793	3258	3708	33180

## Part numbers for ordering, removable convoluted Air Bellows

Ø (mm) (Inch size)	Type	Nb conv.	Air port size BSP	Weight (kg)	Max stroke (mm)	Cups material	Max force (N) at 7 bar	Order code			
								Standard cups		Stainless steel cups	
								Standard bellows	High temp bellows	Standard bellows	High temp bellows
70 (2.3/4")	2.3/4 x 1	1	G1/4	0,35	20	Alu.	3020	9109025	9109525	/	/
	2.3/4 x 2	2		0,50	50		3067	9109009	9109509	/	/
	2.3/4 x 3	3		0,60	65		2672	9109010	9109510	/	/
110 (4.1/2")	4.1/2 x 1	1	G3/8	0,80	45	Alu.	7370	9109400	9109500	/	/
	4.1/2 x 2	2		1,00	80		6700	9109401	9109502	/	/
	4.1/2 x 3	3		1,20	100		6210	9109402	9109503	/	/
150 (6")	6 x 1	1	G1/2	2,00	55	Alu.	12900	9109004A	9109204A	/	/
	6 x 2	2		2,70	120		13800	9109001A	9109201A	/	/
	6 x 3	3		3,00	180		12600	9109007A	9109207A	/	/
150 (6")	6 x 1	1	G1/2	2,50	55	Steel or stainless steel	20980	9109004	9109204	9109004N	9109204N
	6 x 2	2		2,70	120		22290	9109001	9109201	9109001N	9109201N
	6 x 3	3		3,00	180		21040	9109007	9109207	9109007N	9109207N
200 (8")	8 x 1	1	G1/2	3,05	75	Steel or stainless steel	20980	9109014	9109214	9109014N	9109214N
	8 x 2	2		3,75	180		2290	9109011	9109211	9109011N	9109211N
	8 x 3	3		4,30	225		21040	9109017	9109217	9109017N	9109217N
250 (10")	10 x 1	1	G1/2	3,90	100	Steel or stainless steel	31700	9109024	9109224	9109024N	9109224N
	10 x 2	2		5,00	200		35390	9109021	9109221	9109021N	9109221N
	10 x 3	3		5,60	300		33000	9109031	9109231	9109031N	9109231N
300 (12")	12 x 1	1	G1/2	5,20	100	Steel or stainless steel	46070	9109044	9109244	9109044N	9109244N
	12 x 2	2		6,70	195		46760	9109041	9109241	9109041N	9109241N
	12 x 3	3		8,10	330		50520	9109051	9109251	9109051N	9109251N
370 (14.1/2")	14.1/2 x 1	1	G1/2	6,90	115	Steel or stainless steel	67710	9109064	9109264	9109064N	9109264N
	14.1/2 x 2	2		9,10	225		70930	9109061	9109261	9109061N	9109261N
	14.1/2 x 3	3		10,00	350		72010	9109069	9109269	9109069N	9109269N
410 (16")	16 x 1	1	G1/2	7,00	160	Steel or stainless steel	72080	9109026	9109226	9109026N	9109226N
	16 x 2	2		9,70	250		79840	9109171	9109271	9109171N	9109271N
	16 x 3	3 *		12,50	375		76520	9109177	9109277	9109177N	9109277N
550 (21.1/2")	21.1/2 x 2	2	G3/4	20,60	300	Alu.	168890	9109150	9109250	/	/
	21.1/2 x 2	2 **	-	11,50		-	/	9109153	9109253	/	/
660 (26")	26 x 2	2	G3/4	23,70	410	Steel	237600	9109156	/	/	/
	26 x 2	2 **	-	14,60		-	/	9109159	/	/	/

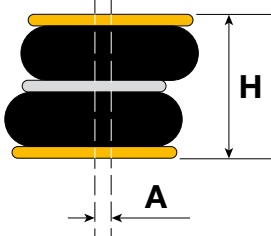
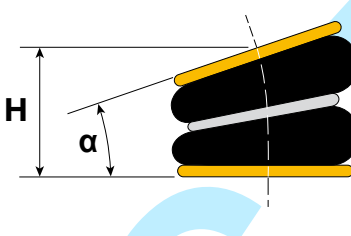
\* Reinforced bellows 4 layers

\*\* Air bellows less cups

**Note:** 16x2, 10x3, 12x3, 14.1/2x3 exist with reinforced 4 layers, add -4P at the end of the part number, ie 9109069-4P**Note:** 4.1/2x2, 8x2, 14.1/2x1 exist without cups on request

## Air Bellows permissible misalignments when Air Bellows are used as actuators

H rec. = recommended installation height | ØN min = minimum space diameter need for installing the Air Bellows

It is not possible to combine angular misalignment with axial misalignment.				Axial			Angular			
The following values are for short time movement during stroke. The Air Bellows may not be exposed to axial misalignment permanently.										
Ø (mm) (Inch size)	Order code	Type	Nb conv.	ØN min (mm)	A = 5 mm for H (mm) between min to max	A = 10 mm for H (mm) between min to max	H rec. (mm)	Angle α = 5° for H (mm) between min to max	Angle α = 10° for H (mm) between min to max	Angle α = 15° for H (mm) between min to max
Ø 70 (2.3/4")	9109025	2.3/4 x 1	1	95			65			
	9109009	2.3/4 x 2	2		80 to 100	85 to 95	105	75 to 100	80 to 95	
	9109010	2.3/4 x 3	3		90 to 125	100 to 115	130	90 to 120	95 to 110	
Ø 110 (4.1/2")	9109400	4.1/2 x 1	1	140	60 to 80	70 to 90	80	60 to 75	65 to 70	
	9109401	4.1/2 x 2	2		75 to 145	85 to 135	135	80 to 125	105 to 145	
	9109402	4.1/2 x 3	3		120 to 200	110 to 180	180	125 to 180	130 to 170	
Ø 150 (6")	9109004A	6 x 1	1	190	65 to 95	75 to 85	100	65 to 90	70 to 85	
	9109001A	6 x 2	2		100 to 175	110 to 165	175		95 to 160	100 to 155
	9109007A	6 x 3	3		115 to 250	105 to 230	255	195 to 255	200 to 250	
Ø 150 (6")	9109004	6 x 1	1	190	65 to 95	75 to 85	95	65 to 90	70 to 85	
	9109001	6 x 2	2		100 to 175	110 to 165	170		95 to 160	100 to 155
	9109007	6 x 3	3		115 to 250	105 to 230	250	195 to 255	200 to 250	
Ø 200 (8")	9109014	8 x 1	1	245	70 to 120	65 to 115	115	60 to 105	70 to 100	
	9109011	8 x 2	2		85 to 240	95 to 230	220	90 to 210	100 to 205	
	9109017	8 x 3	3		110 to 280	100 to 260	300	250 to 305	255 to 300	
Ø 250 (10")	9109024	10 x 1	1	300	65 to 145	70 to 135	135	70 to 115	80 to 105	
	9109021	10 x 2	2		95 to 270	105 to 200	245		95 to 260	115 to 250
	9109031	10 x 3	3		175 to 390	165 to 380	350	245 to 370	280 to 350	
Ø 300 (12")	9109044	12 x 1	1	350	70 to 135	80 to 130	135		75 to 115	90 to 105
	9109041	12 x 2	2		95 to 280	105 to 270	245	100 to 255	110 to 245	
	9109051	12 x 3	3		140 to 410	150 to 400	350	230 to 340	250 to 310	
Ø 370 (14.1/2")	9109064	14.1/2 x 1	1	425	105 to 170	85 to 160	150	65 to 145	85 to 135	
	9109061	14.1/2 x 2	2		110 to 340	120 to 330	270		115 to 290	135 to 275
	9109069	14.1/2 x 3	3		160 to 440	170 to 430	420	300 to 390	310 to 370	
Ø 410 (16")	9109026	16 x 1	1	460		85 to 195	190		85 to 180	
	9109171	16 x 2	2		170 to 325	180 to 315	300	125 to 325	135 to 315	
	9109177	16 x 3	3 *		275 to 500	290 to 485	475		350 to 480	370 to 450
Ø 550 (21.1/2")	9109150	21.1/2 x 2	2	630			350			
Ø 660 (26")	9109156	26 x 2	2	750			425			

\* Reinforced bellows 4 layers

■ = on request

## Vibration isolation (damping) when Air Bellows are used as isolators

The stiffness is the reaction force that appears when Air Bellow deflects from its initial position.

Due to the compression of air the stiffness is not constant and it is a function of effective area variation, volume and pressure variations.

H2 rec. = recommended installation height for best isolation.

Isolation rate I (%) $I = 1 - \frac{1}{\left(\frac{f_e}{f_n}\right)^2 - 1}$ fe=exciting frequency (Hz) fn=natural frequency (Hz)							At 2 bar		At 4 bar		At 6 bar		At 0 bar
Ø (mm) (Inch size)	Order code	Type	Nb conv.	Max stroke (mm)	Static height (mm)	H2 rec. (mm)	Natural Frequency fn (Hz)	Stiffness (daN/mm)	Natural Frequency fn (Hz)	Stiffness (daN/mm)	Natural Frequency fn (Hz)	Stiffness (daN/mm)	Load (N) to obtain H (mm)
70 (2.3/4")	9109025	2.3/4 x 1	1	20	60	62	5,22	5,96	4,79	9,61	4,60	13,37	160 (50)
	9109009	2.3/4 x 2	2	50	90	90	4,14	3,17	3,76	5,25	3,60	7,25	125 (65)
	9109010	2.3/4 x 3	3	65	110	120	3,50	2,06	3,22	3,58	3,12	5,07	250 (80)
110 (4.1/2")	9109400	4.1/2 x 1	1	45	65	72	4,21	7,49	3,87	13,18	3,71	18,49	150 (50)
	9109401	4.1/2 x 2	2	80	100	130	2,94	2,65	2,71	4,95	2,62	7,14	250 (65)
	9109402	4.1/2 x 3	3	100	145	195	2,20	1,31	2,04	2,55	1,96	3,68	100 (100)
150 (6")	9109004A	6 x 1	1	55	80	90	3,76	10,63	3,47	19,19	3,33	27,22	250 (55)
	9109001A	6 x 2	2	120	130	160	2,51	4,41	2,33	7,94	2,25	11,40	170 (75)
	9109007A	6 x 3	3	180	190	230	2,07	2,99	1,91	5,40	1,85	7,73	230 (100)
150 (6")	9109004	6 x 1	1	55	80	85	3,71	9,43	3,43	17,40	3,30	24,90	250 (50)
	9109001	6 x 2	2	120	130	150	2,51	4,55	2,33	8,17	2,25	11,69	170 (70)
	9109007	6 x 3	3	180	190	225	2,07	2,91	1,91	5,27	1,85	7,55	230 (95)
200 (8")	9109014	8 x 1	1	75	90	100	3,05	13,40	2,86	23,79	2,77	34,21	220 (50)
	9109011	8 x 2	2	180	160	200	2,15	4,88	2,00	8,82	1,95	12,81	350 (80)
	9109017	8 x 3	3	225	205	280	1,82	3,34	1,67	6,02	1,60	8,51	280 (100)
250 (10")	9109024	10 x 1	1	100	100	120	2,71	15,00	2,54	27,10	2,46	38,50	150 (50)
	9109021	10 x 2	2	200	170	220	1,93	7,02	1,80	12,54	1,75	17,88	200 (75)
	9109031	10 x 3	3	300	250	320	1,58	4,40	1,47	7,60	1,43	11,00	250 (100)
300 (12")	9109044	12 x 1	1	100	100	120	2,69	23,00	2,51	41,30	2,44	58,80	280 (50)
	9109041	12 x 2	2	195	170	220	1,97	10,90	1,84	20,00	1,78	28,50	170 (75)
	9109051	12 x 3	3	330	250	320	1,58	7,60	1,48	13,30	1,44	18,90	400 (100)
370 (14.1/2")	9109064	14.1/2 x 1	1	115	110	130	2,48	32,80	2,30	55,90	2,22	78,40	360 (50)
	9109061	14.1/2 x 2	2	225	180	250	1,78	15,10	1,66	26,40	1,61	37,30	210 (75)
	9109069	14.1/2 x 3	3	350	280	370	1,43	9,20	1,35	16,30	1,31	23,30	210 (105)
410 (16")	9109026	16 x 1	1	160	130	150	2,29	24,80	2,14	51,30	2,07	73,30	150 (50)
	9109171	16 x 2	2	250	200	290	1,57	12,60	1,48	22,80	1,44	32,30	120 (80)
	9109177	16 x 3	3 *	375	300	400	1,35	9,60	1,26	16,80	1,24	24,40	200 (120)
550 (21.1/2")	9109150	21.1/2 x 2	2	300	200	300	1,71	31,00	1,56	53,80	1,50	75,60	480 (90)
660 (26")	9109156	26 x 2	2	410	200	350	1,37	31,60	1,27	56,00	1,23	79,20	150 (90)

\* Reinforced bellows 4 layers