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climate control
electromechanical
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fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding





Air Bellows

Series 9109
Size Ø70 to Ø660 mm (Ø2 3/4" to Ø26")

Catalogue PDE2576TCUK May 2012



Parker

ENGINEERING YOUR SUCCESS.

Features	Air cylinder	Hydraulic cylinder	Electro mechanical actuators
Overload safe	***	***	*
Easy to limit force	***	***	*
Easy to vary speed	***	***	*
Speed	***	**	**
Reliability	***	***	***
Robustness	***	***	*
Installation cost	***	*	**
Ease of service	***	**	*
Safety in damp environments	***	***	*
Safety in explosive atmospheres	***	***	*
Safety risk with electrical installations	***	***	*
Risk of oil leak	***	*	***
Clean, hygienic	***	**	*
Standardised measurements	***	***	*
Service life	***	***	*
Hydraulic system required	***	*	***
Weight	**	**	**
Purchase price	***	**	*
Power density	**	***	*
Noise level during operation	**	***	**
High force for size	**	***	*
Positioning possibilities	*	***	***
Total energy consumption	*	**	***
Service interval	*	**	***
Compressor capacity required	*	***	***

* = good, **=average, ***=excellent

Important
Before attempting any external or internal work on the cylinder or any connected components, make sure the cylinder is vented and disconnect the air supply in order to ensure isolation of the air supply.

Note
All technical data in this catalogue are typical data only.
Air quality is essential for maximum cylinder service life (see ISO 8573).

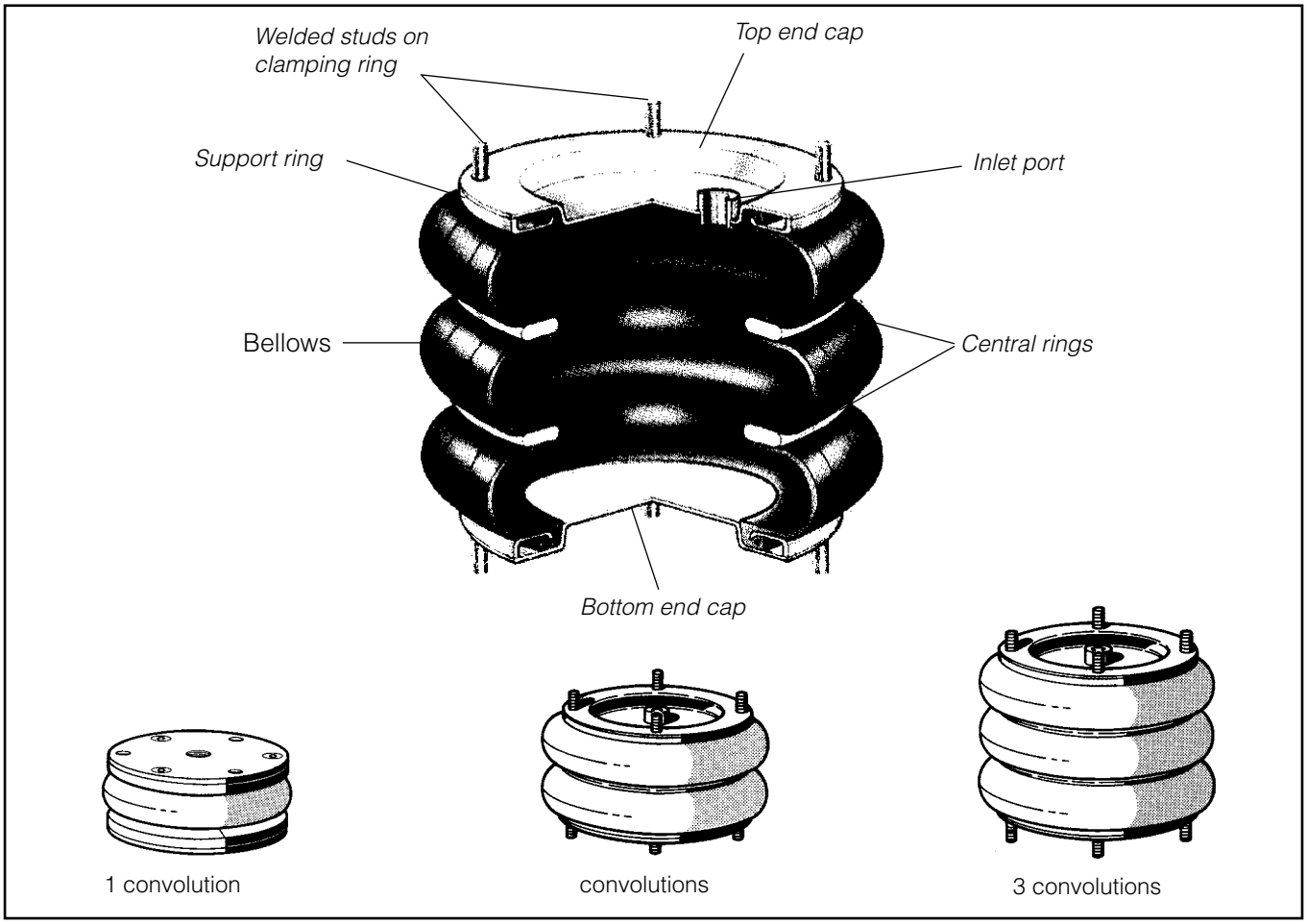
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Air Bellows

Air bellows are the ideal choice for applications requiring short stroke, high thrust single acting actuators.

Manufactured from fabric reinforced synthetic rubber in one, two or three convolutions according to stroke and model. They incorporate no reciprocating metal parts and so provide virtually frictionless thrust compared with conventional pneumatic cylinders.

All models are single acting only. The return stroke is provided in part by the natural spring action of the bellows but more usually by the load itself.
The simplicity of construction provides an extremely long, virtually maintenance-free service life even under arduous conditions.

Air bellows are suitable for vibration applications i.e. device feeders at high frequency.

Versions

Air bellows are available with aluminium or steel end plates and support rings depending upon type (see page 7).

Operation

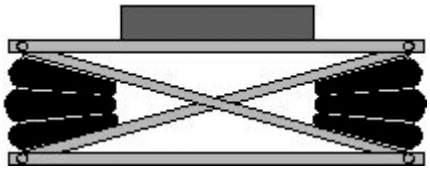
Due to their flexible construction the mounting of Air Bellows is less critical than with conventional pneumatic cylinders, which normally require rigid fixing and guidance and provide only one axis within a limit of 15° between faces. Additionally the axial location of the end plates may be off set by up to 10 mm.

When pressurised Air Bellows will follow the line of leased resistance. Accordingly care must be taken with the mounting geometry in angled applications.

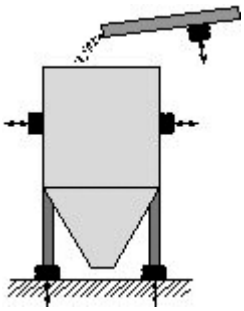
When depressurised Air Bellows will fit in to surprisingly small spaces, especially useful for clamping or moving awkwardly shaped or very heavy loads.

In operation it is recommended that the unit is not allowed to "bottom out" or achieve its maximum height. Various mechanical devices may be employed to achieve this.

Applications



Scissor lift



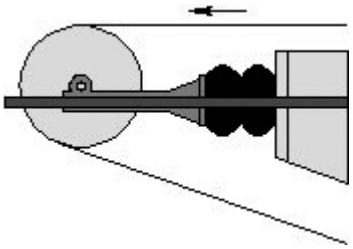
Hopper vibration and damping



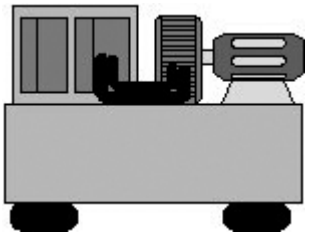
Mechanical handling stop



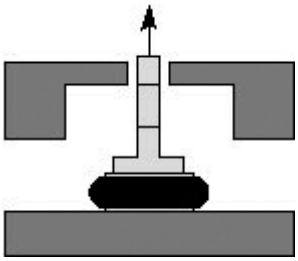
Quick lock device



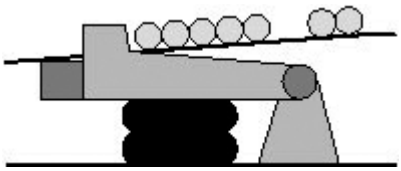
Reel tensioning



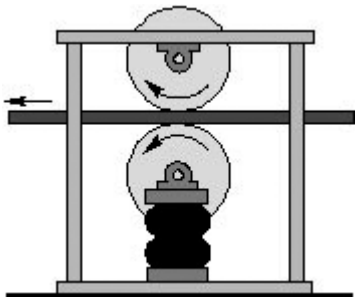
Machine isolation



Direct force



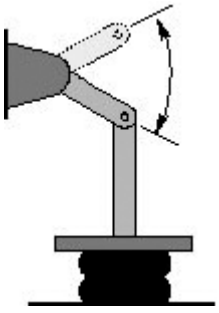
Impact absorbtion



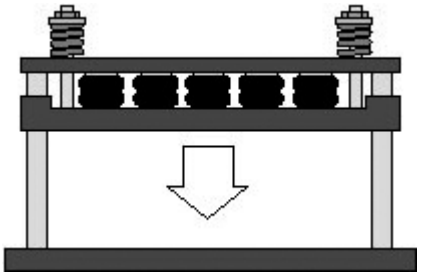
Roller tensioning



Platform lift



Short stroke mechanical linkage

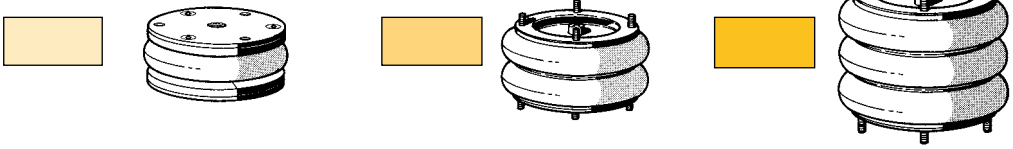


Hot foil stamping press

Developed forces

Types bore mm inch	Max force in N for max stroke at 1 bar	Max stroke mm	Height mm min	Height mm max	Load to obtain min. helght in N	Force (in N) at 1 bar Note : Max. force and stroke may exceed values - see columns to the left												
70 2¾	70	50	65	115	140	400	250	70										
	70	65	80	145	140	370	270	150										
110 4½	200	45	45	90	120	1150	700	200										
	280	80	65	145	130	900	750	550	300									
	280	100	100	200	140	900	750	600	450	280								
150 6	350	55	50	105	140	1900	1200	500										
	400	112	78	190	170	1800	1650	1400	1100	800	450							
	400	173	102	275	190	1800	1600	1400	1200	1000	800	600	400					
200 8	850	75	50	125	120	3200	2400	1700	850									
	800	180	70	250	130	3000	2900	2600	2250	1900	1600	1200	800					
	800	225	100	325	150	3000	27500	2500	2250	2000	1750	1500	1250	1050	950			
250 10	1000	100	50	150	100	5000	4000	3300	2100	1000								
	1250	200	70	270	100	4800	4500	4250	3700	3200	2800	2400	1800	1250				
	800	300	100	400	110	4800	4600	4400	4160	3900	3600	3300	2900	2500	2100	1700	1300	800
300 12	2000	100	50	150	90	6500	5900	4900	3500	2000								
	2250	195	75	270	90	6800	6400	6000	5200	4800	4200	3150	2950	2250				
	1800	330	100	430	100	6800	6500	6200	5850	5500	5200	4800	4400	4000	3600	3000	2500	1800
370 14½	3500	115	50	165	80	9600	8800	7700	6300	4500								
	4500	225	70	295	80	10000	9500	9000	8500	7800	7250	6600	6000	5250	4500			
	3500	350	100	450	290	10200	10000	9700	9550	9250	8750	8500	8000	7500	7100	6500	6000	5500
410 16	5300	250	75	325	80	11400	11100	10600	10100	9600	9000	8400	7750	7200	6500	5300		
	4200	375	125	500	640	10500	10250	10000	9600	9250	8900	8600	8200	7700	7250	6750	6250	5750
550 21½	6000	300	90	390	70	24000	23000	22000	20080	19500	18200	17000	15300	13800	12000	10000	8000	6000
660 26	18200	310	90	400	70	30800	30500	30000	29200	28100	26900	25600	24300	23000	21800	20700	19500	18200
Stroke						**0**	**25**	**50**	**75**	**100**	**125**	**150**	**175**	**200**	**225**	**250**	**275**	**300**

Colour codes for air bellow types



One convolution **Two convolutions** **Three convolutions**

Selection of Air Bellows

1. Establish the force required in N at working air pressure.
2. Divide the force required by the working air pressure in bar.
3. Select the standard stroke: always choose the next highest stroke to that required.
4. Read upwards in the column to find the figure equal to or greater than the figure which resulted from step 2.
5. Read accross to the left for recommended unit size.

Example

1. Force required 35000 N. Working air pressure 7 bar.
2. Force at 1 bar is: 35000 / 7 = 5000 N.
3. Stroke required 120 mm - Use 125 mm.
4. Use 125 stroke column, 5200 N at 1 bar.
5. Recommended unit is Ø300 mm (i.e. 12") 3 convolutions.

Material

Standard version

End plates

Ø 70, 110, 150*, 550 (i.e. 2¾", 4½", 6"*, 21½")	Aluminium
Ø 150*, 200, 250, 300, 370, 410, 660 (i..e. 6"*, 8", 10", 12", 14½", 16", 26")	Steel

Clamping ring, central ring

Ø 70, 110, 150*, 550, 660 (i.e. 2¾", 4½", 6"*, 21½", 26")	Aluminium
Ø 150*, 200, 250, 300, 370, 410 (i.e. 6"*, 8", 10", 12", 14½", 16")	Steel

* Ø 150 (i.e. 6") exists in aluminium and steel version

Steel 304 version (on studs version):
from Ø 150 to Ø 410 (i.e. from 6" to 16")

Bellows

Standard

Natural rubber (NR) (50%), Nitrile butadiene rubber (NBR) (25%), Stryrene butadiene rubber (SBR) (25%)

High temperature version:

Bellows material : Chlorobutyl

Operation data

Working pressure	Max. 8 bar
Working temperature	-30 °C to +70 °C (in dynamic) -40 °C to +90 °C (in static)

High temperature version:

- 30 °C to + 90 °C dynamic
- 25 °C to + 100 °C static

Mounting

Ø 70, 110, 150, 550, 660 (i.e. 2¾", 4½", 6", 21½", 26")	Threaded holes
Ø 150, 200, 250, 300, 370, 410 (i.e. 6", 8", 10", 12", 14½", 16")	Studs

Clamping torques for screws and mounting nuts

Ø 70 x 2 and 70 x 3 (i.e. 2¾" x 2 and 2¾" x 3)	5 Nm
Ø 110 x 1 to 110 x 3 (i.e. 4½" x 1 to 4½" x 3)	7 up to 11 Nm
Ø 150 x 1 to 150 x 3 (i.e. 6" x 1 to 6" x 3)	12 Nm
Ø 200 x 1 to 660 x 2 (i.e. 8" x 1 to 26" x 2)	20 to 28 Nm

Main data

- 10 sizes, diameters 70-660 mm (i.e. 2¾"-26")
- Strokes from 65 to 430 mm
- Single, double or triple convolutions
- Angular misalignment: 15° max.
- Axial misalignment: 10 mm max.
- High thrust and frictionless movement
- Maintenance free

Working medium, air quality

Working medium: Dry, filtered compressed air to ISO 8573-1 class 3.4.3.

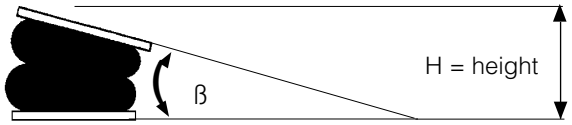
Recommended air quality for cylinders

For best possible service life and trouble-free operation, ISO 8573-1 quality class 3.4.3 should be used. This means 5 µm filter (standard filter) dew point +3 °C for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m³, which is what a standard compressor with a standard filter gives.

ISO 8573-1 quality classes

Quality class	Pollution particle size (µm)	Pollution max con-centration (mg/m³)	Water max. press. dew point (°C)	Oil max con-centration (mg/m³)
1	0,1	0,1	-70	0,01
2	1	1	-40	0,1
3	5	5	-20	1,0
4	15	8	+3	5,0
5	40	10	+7	25
6	-	-	+10	-

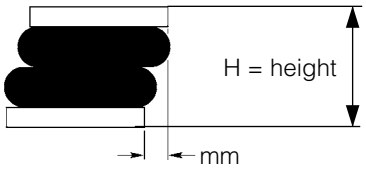
Angular misalignment



It is not possible to combine angular misalignment with axial misalignment.

Ø (mm)	Types	Angle ß = 5° For heights (mm) between	Angle ß = 10° For heights (mm) between	Angle ß =15° For heights (mm) between
70	2¾ x 2	75-100	80-95	/
	2¾ x 3	90-120	95-110	/
110	4½ x 1	60-75	65-70	/
	4½ x 2	/	80-125	105-145
	4½ x 3	125-180	130-170	/
150	6 x 1	65-90	70-85	/
	6 x 2	/	95-160	100-155
	6 x 3	195-255	200-250	/
200	8 x 1	60-105	70-100	/
	8 x 2	/	90-210	100-205
	8 x 3	/	250-305	255-300
250	10 x 1	/	70-115	80-105
	10 x 2	/	95-260	115-250
	10 x 3	/	245-370	280-350
300	12 x 1	/	75-115	90-105
	12 x 2	/	100-255	110-245
	12 x 3	/	230-340	250-310
370	14 ½ x 1	65-145	85-135	/
	14 ½ x 2	/	115-290	135-275
	14½ x 3	/	300-390	310-370
410	16 x 2	/	125-325	135-315
	16 x 3	/	350-480	370-450
550	21½ x 2			
660	26 x 2			

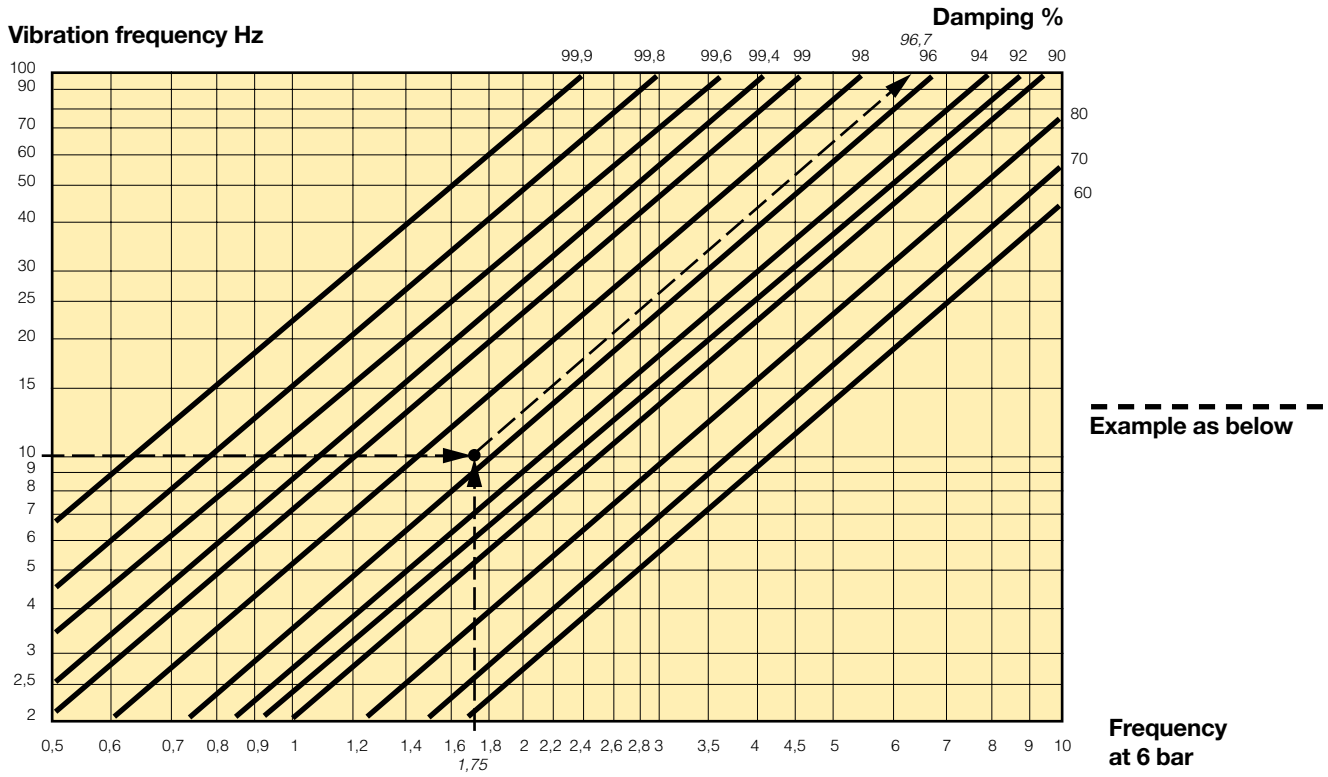
Axial misalignment



The following values are for short time movement during stroke. The air bellows may not be exposed for axial misalignment. permanently.

Ø (mm)	Types	5 m m For heights (mm) between	10 mm For heights (mm) between
70	2¾ x 2	80-100	85-95
	2¾ x 3	90-125	100-115
110	4½ x 1	60-80	70-90
	4½ x 2	75-145	85-135
	4½ x 3	120-200	110-180
150	6 x 1	65-95	75-85
	6 x 2	100-175	110-165
	6 x 3	115-250	105-230
200	8 x 1	70-120	65-115
	8 x 2	85-240	95-230
	8 x 3	110-280	100-260
250	10 x 1	65-145	70-135
	10 x 2	95-270	105-200
	10 x 3	175-390	165-380
300	12 x 1	70-135	80-130
	12 x 2	95-280	105-270
	12 x 3	140-410	150-400
370	14½ x 1	105-170	85-160
	14½ x 2	110-340	120-330
	14½ x 3	160-440	170-430
410	16 x 2	170-325	180-315
	16 x 3	275-500	290-485
550	21½ x 2		
660	26 x 2		

Vibration isolation (damping) charts



Air Bellows frequency Hz

Ø mm	Convolution	Types	Frequency 6 bar Hz	Static height mm	Loading 6 bar in kg
70	2	23/4 X 2	3,8	90	150
	3	23/4 X 3	3,2	110	156
110	1	41/2 X 1	3,8	70	335
	2	41/2 X 2	3	100	390
	3	41/2 X 3	2,6	145	378
150	1	6 X 1	3,2	80	640
	2	6 X 2	2,2	140	685
	3	6 X 3	1,9	180	660
200	1	8 x 1	2,77	90	1275
	2	8 x 2	1,95	160	1225
	3	8 x 3	1,75	210	1200
250	1	10 x 1	2,63	100	1960
	2	10 x 2	1,75	170	1900
	3	10 x 3	1,43	250	1770
300	1	12 x1	2,44	100	2975
	2	12 x 2	1,78	170	2910
	3	12 x 3	1,44	250	2930
370	1	141/2 x 1	2,22	110	4555
	2	141/2 x 2	1,61	200	4445
	3	141/2 x 3	1,31	290	4320
410	2	16 x 2	1,44	200	5195
	3	16 x 3	1,24	290	4950
550	2	211/2 x 2	1,49	200	11785

How damping is calculated in %

1. Search the vertical axis of the graph for the frequency of vibration that requires damping.
2. Search for the loading and size of the unit in the lower table.

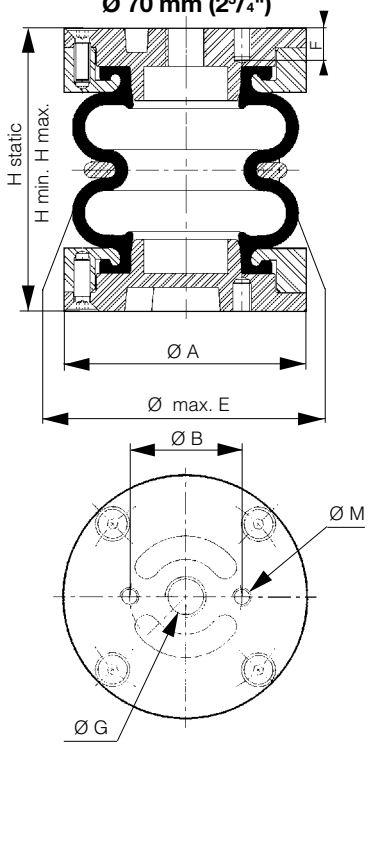
   (Note that bellows with twin and triple convolutions give better damping but higher static height.)
3. Having chosen the unit required, select the frequency in Hz on the bottom axis on the graph.
4. Where the lines from steps 1 and 3 intersect, follow the diagonal line up to the top right-hand edge of the graph to find the damping value.

Example

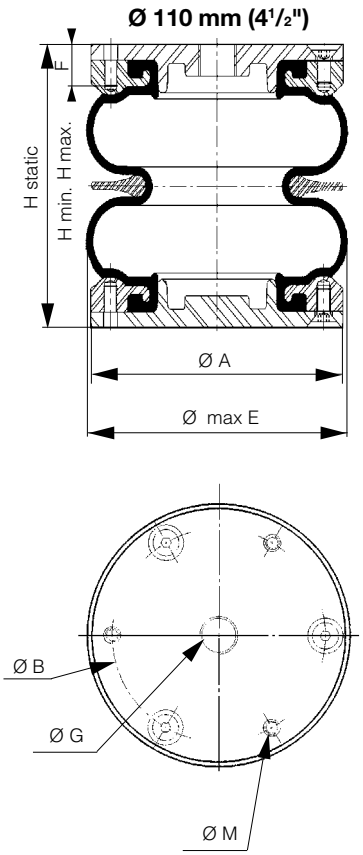
1. Frequency to be damped = 10 Hz.
2. Loading of Air Bellows unit = 1500 kg.
3. The bellows cylinder in this example has twin bellows, Ø 250 (10" x 2) which, according to the table, gives a frequency of 1.75 Hz at 6 bar.
4. This produces 96,7% damping according to the diagram above.

Mounting dimensions

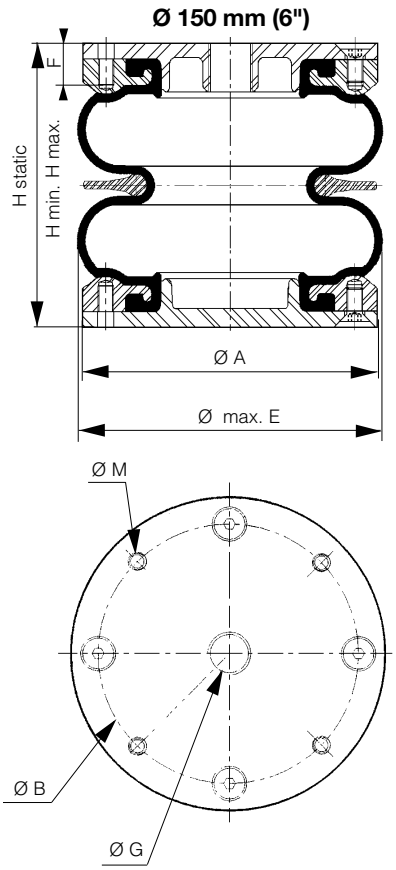
Aluminium end plates version
Ø 70 mm (2¾")



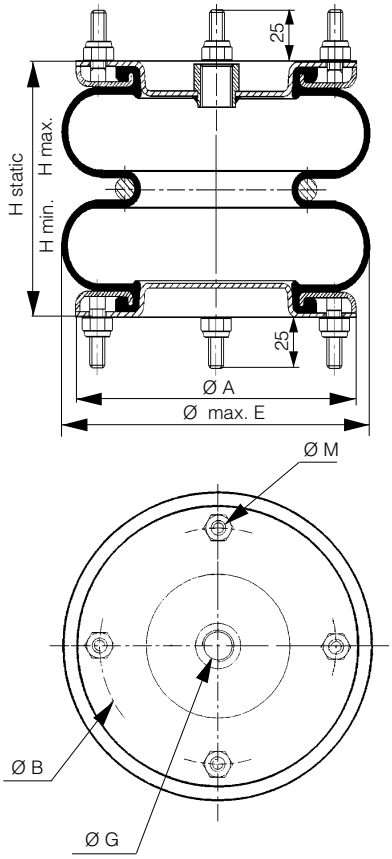
Ø 110 mm (4½")



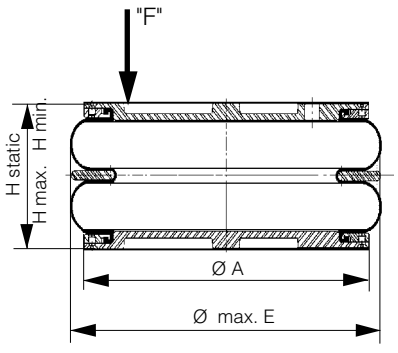
Ø 150 mm (6")

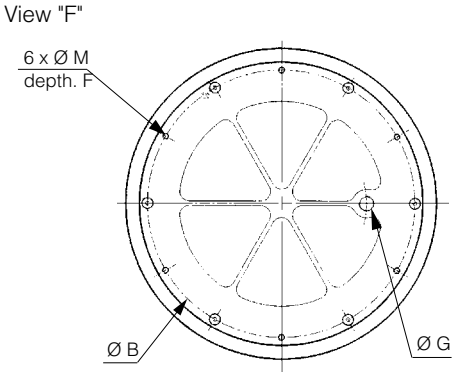


Steel end plates version
Ø 150 to 410 mm (6 to 16")



Aluminium end plates version / Steel end plates version
Ø 550 mm (21½") / Ø 660 mm (26")





Mounting dimensions

Ø mm	Types	H min mm	H static mm	H max mm	Max stroke mm	ØE static mm	ØE max mm	ØA mm	ØB mm	F mm	ØM mm	Ø Port size	Max. pressure bar	Weight kg
70	2¾ x 2	65	90	115	50	78	80	78	36	9	M6	G1/4	8	0,5
	2¾ x 3	80	110	145	65	78	80	78	36	9	M6	G1/4	8	0,6
110	4½ x 1	45	65	90	45	114	125	110	93	13	M6	G3/8	8	0,8
	4½ x 2	65	100	145	80	114	125	110	93	13	M6	G3/8	8	1
	4½ x 3	100	145	200	100	114	125	110	93	13	M6	G3/8	8	1,2
150	6 x 1 (alu.)	50	80	105	55	153	175	152,5	127	16	M8	G1/2	8	2
	6 x 1 (steel)	50	80	105	55	153	175	155	127		M10	G1/2	8	2,4
	6 x 2 (alu.)	78	130	190	112	153	175	152,5	127	16	M8	G1/2	8	2,7
	6 x 2 (steel)	70	130	190	120	153	175	155	127		M10	G1/2	8	2,7
	6 x 3 (alu.)	102	190	275	173	153	175	152,5	127	16	M8	G1/2	8	3
	6 x 3 (steel)	95	190	275	180	153	175	155	127		M10	G1/2	8	3
200	8 x 1	50	90	125	75	204	230	184	155,5		M10	G1/2	8	3,05
	8 x 2	70	160	250	180	204	230	184	155,5		M10	G1/2	8	3,75
	8 x 3	100	205	325	225	204	230	184	155,5		M10	G1/2	8	4,3
250	10 x 1	50	100	150	100	254	280	210	181		M10	G1/2	8	3,9
	10 x 2	70	170	270	200	254	280	210	181		M10	G1/2	8	5
	10 x 3	100	250	400	300	254	280	210	181		M10	G1/2	8	5,6
300	12 x 1	50	100	150	100	305	330	260	232		M10	G1/2	8	5,2
	12 x 2	75	170	270	195	305	330	260	232		M10	G1/2	8	6,7
	12 x 3	100	250	430	330	305	330	260	232		M10	G1/2	8	8,1
370	14½ x 1	50	110	165	115	368	395	310	282,5		M10	G1/2	8	6,9
	14½ x 2	70	180	295	225	368	395	310	282,5		M10	G1/2	8	9,1
	14½ x 3	100	280	450	350	368	395	310	282,5		M10	G1/2	8	10
410	16 x 2	75	200	325	250	406	440	310	282,5		M10	G1/2	8	9,7
	16 x 3	125	300	500	375	406	440	310	282,5		M10	G1/2	8	12,5
550	21½ x 2	90	200	390	300	546	580	498,5	470	19	M10	G3/4	7	20,6
	21½ x 2 (Air Bellows less end caps)	90	200	390	300	546	580	498,5	470		M10	G3/4	8	11,5
660	26 x 2	90	200	400	310	660	700	601	470	19	M10	G3/4	8	23



Clamping torques for screws and mounting nuts

Ø 70 x 2 and 70 x 3 (i.e. 2¾" x 2 and 2¾" x 3)	5 Nm
Ø 110 x 1 to 110 x 3 (i.e. 4½" x 1 to 4½" x 3)	7 to11 Nm
Ø 150 x 1 to 150 x 3 (i.e. 6" x 1 to 6" x 3)	12 Nm
Ø 200 x 1 to 660 x 2 (i.e. 8" x 1 to 26" x 2)	20 to 28 Nm



It is imperative that external machanical stops are used to limit the stroke. The units should not achieve maximum stroke or be allowed to "bottom out".
Air Bellows may not be stacked, use singly only.

Air Bellows minimum and maximum volume

Ø mm	Types	Minimumvolume* (at 4 bar) cm³	Maximum volume** (at 4 bar) cm³
70	2¾ x 2	75	155
	2¾ x 3	98	206
110	4½ x 1	7	145
	4½ x 2	175	590
	4½ x 3	400	1025
150	6 x 1 (alu.)	70	815
	6 x 1 (steel)	70	815
	6 x 2 (alu.)	120	1670
	6 x 2 (steel)	120	1670
	6 x 3 (alu.)	150	2550
	6 x 3 (steel)	150	2550
200	8 x 1	300	280
	8 x 2	680	4850
	8 x 3	1250	5750
250	10 x 1	400	4400
	10 x 2	1100	8200
	10 x 3	2300	13000
300	12 x 1	793	6400
	12 x 2	500	11900
	12 x 3	8000	21350
370	14½ x 1	910	10700
	14½ x 2	1810	21500
	14½ x 3	4000	33000
410	16 x 2	3610	28300
	16 x 3	9000	39000
550	21½ x 2	10610	55000
660	26 x 2		

* The minimum volume corresponds to the minimal height of the Air Bellow

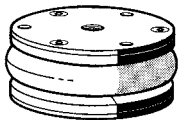
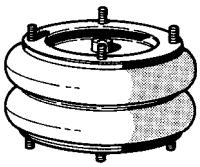
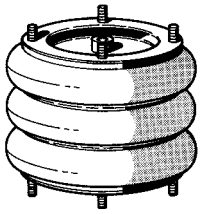
** The maximum volume corresponds to the maximal height of the Air Bellow



It is imperative that external machanical stops are used to limit the stroke. The units should not achieve maximum stroke or be allowed to "bottom out".
Air Bellows may not be stacked, use singly only.



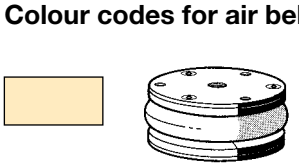
Orders codes

Symbol	Ø mm	Types	Port size	Max stroke mm	Order code Standard	Order code High temp	Order code Stainless
One convolution 	**110**	4½ x 1	G3/8	45	**9109400**	**9109600**	/
	150	6 x 1 (alu.)	G1/2	55	**9109004A**	**9109204A**	/
	150	6 x 1 (steel)	G1/2	55	**9109004**	**9109204**	**9109004N**
	200	8 x 1	G1/2	75	**9109014**	**9109214**	**9109014N**
	250	10 x 1	G1/2	100	**9109024**	**9109224**	**9109024N**
	300	12 x 1	G1/2	100	**9109044**	**9109244**	**9109044N**
	370	14½ x 1	G1/2	115	**9109064**	**9109264**	**9109064N**
Two convolutions 	**70**	2¾ x 2	G1/4	50	**9109009**	**9109509**	/
	110	4½ x 2	G3/8	80	**9109401**	**9109502**	/
	150	6 x 2 (alu.)	G1/2	112	**9109001A**	**9109201A**	/
	150	6 x 2 (steel)	G1/2	112	**9109001**	**9109201**	**9109001N**
	200	8 x 2	G1/2	180	**9109011**	**9109211**	**9109011N**
	250	10 x 2	G1/2	200	**9109021**	**9109221**	**9109021N**
	300	12 x 2	G1/2	195	**9109041**	**9109241**	**9109041N**
	370	14½ x 2	G1/2	225	**9109061**	**9109261**	**9109061N**
	410	16 x 2	G1/2	250	**9109171**	**9109271**	**9109171N**
	550	21½ x 2 21½ x 2 (Air Bellows less end caps)	G3/4	300	**9109150** **9109153**	**9109250** /	/ /
	660	26 x 2	G3/4	310	**9109156**	/	/
Three convolutions 	**70**	2¾ x 3	G1/4	65	**9109010**	**9109510**	/
	110	4½ x 3	G3/8	100	**9109402**	**9109503**	/
	150	6 x 3 (alu.)	G1/2	173	**9109007A**	**9109207A**	/
	150	6 x 3 (steel)	G1/2	173	**9109007**	**9109207**	**9109007N**
	200	8 x 3	G1/2	225	**9109017**	**9109219**	**9109017N**
	250	10 x 3	G1/2	300	**9109031**	**9109231**	**9109031N**
	300	12 x 3	G1/2	330	**9109051**	**9109251**	**9109051N**
	370	14½ x 3	G1/2	350	**9109069**	**9109269**	**9109069N**
	410	16 x 3	G1/2	375	**9109177**	**9109275**	**9109177N**

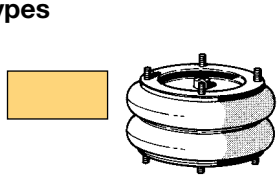
Spare parts

Ø mm	Types	Bellows		End plates		Support ring	Central ring
		Standard	High temp.	Without inlet port	With inlet port		
One convolution							
110	4½ x 1	**9109145**	**9109288**	**9109188**	**9109187**	**9109186**	**9109184**
150	6 x 1 (alu.) 6 x 1 (steel)	**9109191** **9109191**	**9109391** **9109391**	**9109070A** **9109070**	**9109075A** **9109075**	**9109080A** **9109080**	**9109098A** **9109098**
200	8 x 1	**9109192**	**9109392**	**9109071**	**9109076**	**9109086**	**9109099**
250	10 x 1	**9109146**	**9109393**	**9109072**	**9109077**	**9109087**	**9109100**
300	12 x 1	**9109195**	**9109395**	**9109073**	**9109078**	**9109088**	**9109101**
370	14½ x 1	**9109197**	**9109397**	**9109074**	**9109178**	**9109089**	**9109170**
Two convolutions							
70	2¾ x 2	**9109152**	**9109303**	**9109065**	**9109181**	**9109193**	**9109209**
110	4½ x 2	**9109189**	**9109289**	**9109188**	**9109187**	**9109186**	**9109184**
150	6 x 2 (alu.) 6 x 2 (steel)	**9109091** **9109091**	**9109291** **9109291**	**9109070A** **9109070**	**9109075A** **9109075**	**9109080A** **9109080**	**9109098A** **9109098**
200	8 x 2	**9109092**	**9109292**	**9109071**	**9109076**	**9109086**	**9109099**
250	10 x 2	**9109093**	**9109293**	**9109072**	**9109077**	**9109087**	**9109100**
300	12 x 2	**9109095**	**9109295**	**9109073**	**9109078**	**9109088**	**9109101**
370	14½ x 2	**9109097**	**9109297**	**9109074**	**9109178**	**9109089**	**9109170**
410	16 x 2	**9109199**	**9109298**	**9109074**	**9109178**	**9109089**	**9109170**
550	21½ x 2	**9109190**	**9109290**	**9109068**	**9109067**	**9109183**	**9109185**
660	26 x 2	**9109198**		**9109155**	**9109157**	**9109183**	**9109185**
Three convolutions							
70	2¾ x 3	**9109090**	**9109304**	**9109065**	**9109181**	**9109193**	**9109209**
110	4½ x 3	**9109147**	**9109287**	**9109188**	**9109187**	**9109186**	**9109184**
150	6 x 3 (alu.) 6 x 3 (steel)	**9109149** **9109149**	**9109286** **9109286**	**9109070A** **9109070**	**9109075A** **9109075**	**9109080A** **9109080**	**9109098A** **9109098**
200	8 x 3	**9109151**	**9109300**	**9109071**	**9109076**	**9109086**	**9109099**
250	10 x 3	**9109094**	**9109294**	**9109072**	**9109077**	**9109087**	**9109100**
300	12 x 3	**9109096**	**9109296**	**9109073**	**9109078**	**9109088**	**9109101**
370	14½ x 3	**9109148**	**9109301**	**9109074**	**9109178**	**9109089**	**9109170**
410	16 x 3	**9109200**	**9109299**	**9109074**	**9109178**	**9109089**	**9109170**

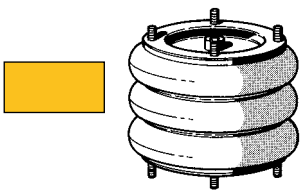
Colour codes for air bellow types



One convolution



Two convolutions



Three convolutions

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