

AIR SPRING

FOR

INDUSTRIAL

APPLICATION



Vishwaraj Rubber Industries

Our aim is to **Manufacture Rubber Product**
long lasting and safe use for **industries.**

- © HIGH QUALITY
AIR SPRINGS
- © LONG LIFECYCLE



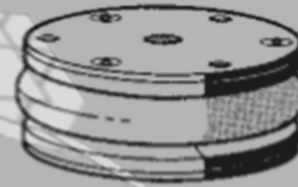
- © EASY TO MAINTAIN
- © REPLACEABLE PARTS



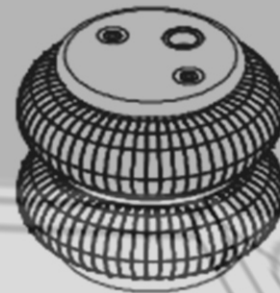
Types and Designs of AIR SPRINGS

CONVOLUTION

- SINGLE
- DOUBLE
- TRIPLE



One convolution



Two convolutions

TOP PLATE TYPE

- STEEL PLATE
- AL. PLATE
- S.S. PLATE



Three convolutions

Company Profile

Vishwaraj Rubber Industries is founded in **year 2002**, a small scale industry manufacturing & marketing of Anti Vibration Pads/Mounts and Rubber Parts as per Sample/Drawing. Mr. B M Patel – Proprietor, is in rubber industry from last more than two decades and specialized in the field of anti-vibration and structure born noise isolation.

We, at **Vishwaraj**, manufacture **quality Anti Vibration Machine Pads, Round Leveling Mounts, Precision Wedge Mounts, Base Mounts** and **special tailor made mounts for special applications**. Products are manufactured using materials such as Nitrile Rubber, Cork articles, Chemicals, and High Grade Castings & Fasteners. Our product range covers a wide range of applications from Forging Hammer to Air Compressor.

Our product range also includes **Air Bellows (Air Spring)** an import substitute. It offers outstanding solutions for vibration & insulation problems.

Keeping in mind the sole aim of manufacturing quality products, **Vishwaraj** is increasing its customer base in the market day by day and have become regular supplier to Machinery & Equipment Manufacturing Industry. Efforts are being put to create awareness amongst the actual users in the larger interest of the industry and building reputation at the grass root level. Company has trained, dedicated employees in plant as well as efficient Marketing Department who are determined to provide quality products and service for total satisfaction to our valued users. On request, **Vishwaraj's** own installation team can also provide installation service.

At **Vishwaraj**, it is continuous process to explore all possibilities to innovate product range and to upgrade for its maximum performance. **Vishwaraj** is growing steadily and will leap further with **customer's satisfaction** and confidence.

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Industrial Air Springs

Air Springs

Air Springs 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 Springs are suitable for vibration applications i.e. device feeders at high frequency. Versions Air bellows are available with aluminum or steel end plates and support rings depending upon type.

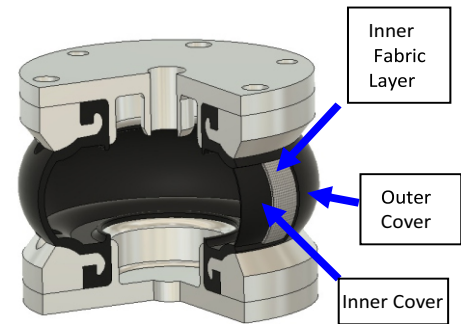
Operation

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 offset by up to 10 mm.

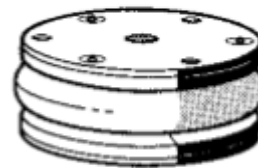
When pressurized Air Bellows will follow the line of least resistance. Accordingly care must be taken with the mounting geometry in angled applications.

When depressurized 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.



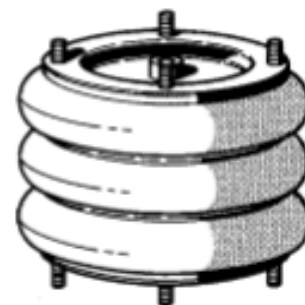
Section View



One Convolution

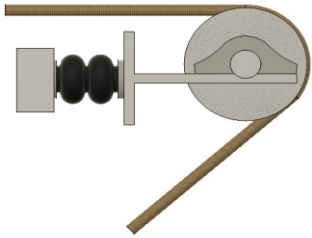
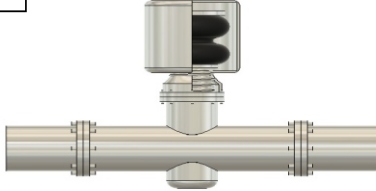
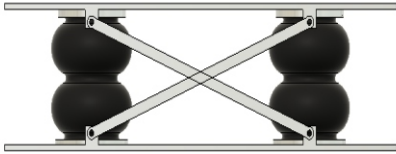
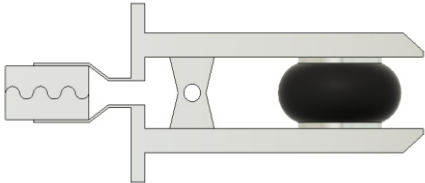
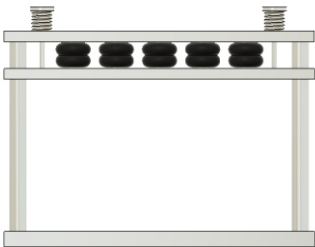
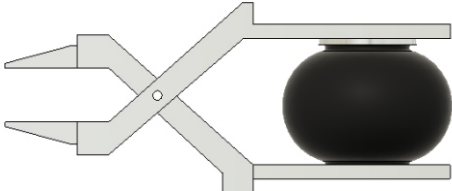
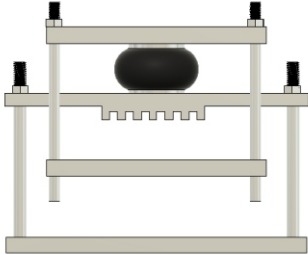
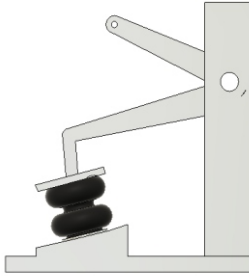
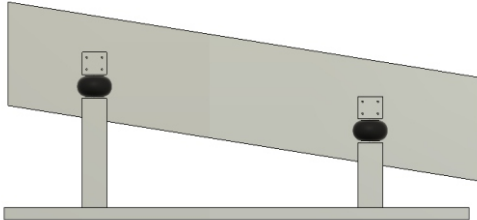
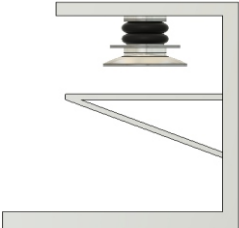
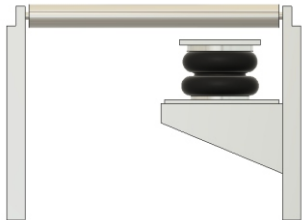
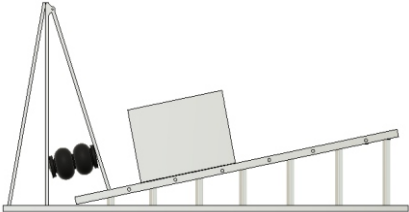


Two Convolutions



Three Convolutions

Industrial Air Springs

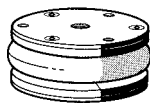
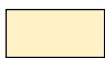
	APPLICATION
 <p>CABLE TENSIONING DEVICE</p>	 <p>GATE VALVE OPERATOR</p>
 <p>SCISSOR LIFT</p>	 <p>SHEET WELDING CLAMP</p>
 <p>GLUING PRESS</p>	 <p>CORE STRAIGHTNER</p>
 <p>DIE STRIPPER</p>	 <p>PRESSURE ROLL FOR CALENDER</p>
 <p>VIBRATING SCREEN</p>	 <p>HOT FOIL STAMPING PRESS</p>
 <p>ROLLER FRICTION BREAK</p>	 <p>CONVEYOR END STOP</p>

Industrial Air Springs

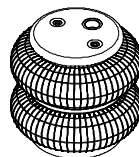
Developed forces

Types bore mm inch	Max force in N for max stroke at 1 bar	Max stroke mm	Height mm		Load to obtain min. height in N	Force (in N) at 1 bar Note : Max. force and stroke may exceed values - see columns to the left															
			min	max																	
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			

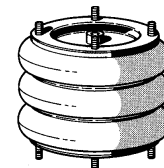
Colour codes for air bellow types



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 across 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.

Industrial Air Springs

Material

Standard Fittings

End plates

Ø 80, 110, 150, 550

(i.e. 3½", 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 80, 110, 150, 550, 660

(i.e. 3½", 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%), Styrene butadiene rubber (SBR) (25%)

Operation data

Working pressure

Max. 8 bar

Working temperature

-30 °C to +70 °C (in dynamic)

-40 °C to +90 °C (in static)

Mounting

Ø 80, 110, 150, 550, 660

(i.e. 3½", 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 80 x 2 and 80 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 80-660 mm (i.e. 3½"-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

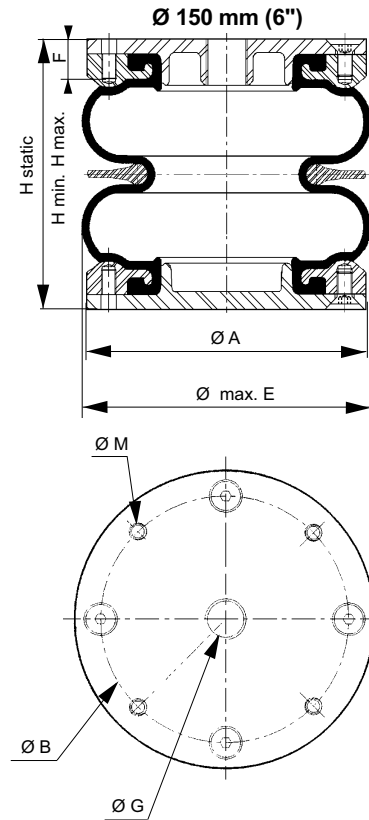
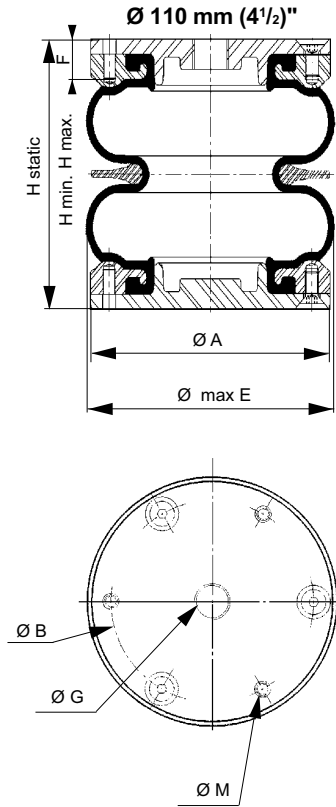
Recommended air quality for cylinders

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.

Industrial Air Springs

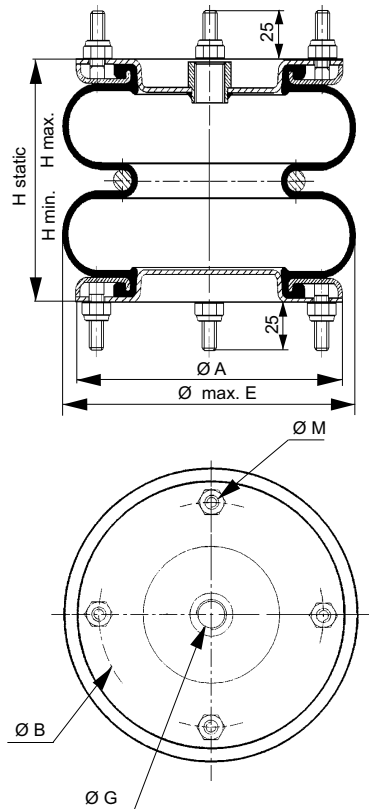
Mounting Dimensions

Series: VFAL, VFMS, VFSS

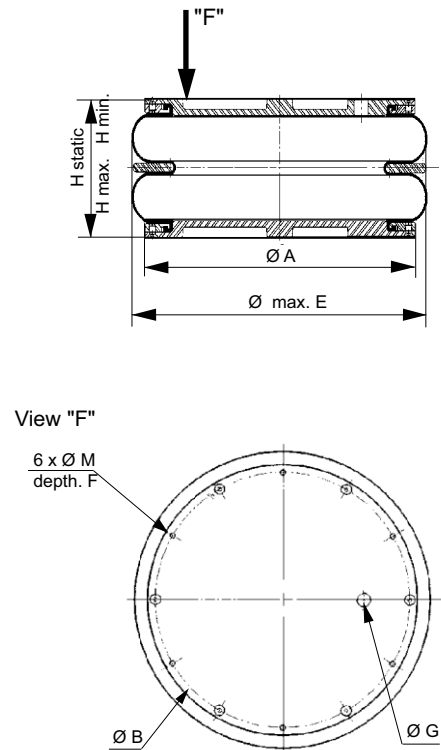


Steel end plates version
Ø 150 to 410 mm (6 to 16")

Series: VMS, VSS



Aluminium end plates version / Steel end plates version
Ø 550 mm (21 1/2") / Ø 660 mm (26")



Industrial Air Springs

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
70	¾ x 2	65	90	115	50	78	80	78	36	9	M6	G1/4	8
	¾ x 3	80	110	145	65	78	80	78	36	9	M6	G1/4	8
110	4½ x 1	45	65	90	45	114	125	110	93	13	M6	G3/8	8
	4½ x 2	65	100	145	80	114	125	110	93	13	M6	G3/8	8
	4½ x 3	100	145	200	100	114	125	110	93	13	M6	G3/8	8
150	6 x 1 (alu.)	50	80	105	55	153	175	152,5	127	16	M8	G1/2	8
	6 x 1 (steel)	50	80	105	55	153	175	155	127		M10	G1/2	8
	6 x 2 (alu.)	78	130	190	112	153	175	152,5	127	16	M8	G1/2	8
	6 x 2 (steel)	70	130	190	120	153	175	155	127		M10	G1/2	8
	6 x 3 (alu.)	102	190	275	173	153	175	152,5	127	16	M8	G1/2	8
	6 x 3 (steel)	95	190	275	180	153	175	155	127		M10	G1/2	8
200	8 x 1	50	90	125	75	204	230	184	155,5		M10	G1/2	8
	8 x 2	70	160	250	180	204	230	184	155,5		M10	G1/2	8
	8 x 3	100	205	325	225	204	230	184	155,5		M10	G1/2	8
250	10 x 1	50	100	150	100	254	280	210	181		M10	G1/2	8
	10 x 2	70	170	270	200	254	280	210	181		M10	G1/2	8
	10 x 3	100	250	400	300	254	280	210	181		M10	G1/2	8
300	12 x 1	50	100	150	100	305	330	260	232		M10	G1/2	8
	12 x 2	75	170	270	195	305	330	260	232		M10	G1/2	8
	12 x 3	100	250	430	330	305	330	260	232		M10	G1/2	8
370	14½ x 1	50	110	165	115	368	395	310	282,5		M10	G1/2	8
	14½ x 2	70	180	295	225	368	395	310	282,5		M10	G1/2	8
	14½ x 3	100	280	450	350	368	395	310	282,5		M10	G1/2	8
410	16 x 2	75	200	325	250	406	440	310	282,5		M10	G1/2	8
	16 x 3	125	300	500	375	406	440	310	282,5		M10	G1/2	8
550	21½ x 2	90	200	390	300	546	580	498,5	470	19	M10	G3/4	7
	21½ x 3 (Air Bellows less end caps)	90	200	390	300	546	580	498,5	470		M10	G3/4	8
660	26 x 2	90	200	400	310	660	700	601	470	19	M10	G3/4	8



Clamping torques for screws and mounting nuts

Ø 80 x 2 and 80 x 3 (i.e. 3½" x 2 and 3½" x 3)	5 Nm
Ø 110 x 1 to 110 x 3 (i.e. 4½" x 1 to 4½" x 3)	7 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

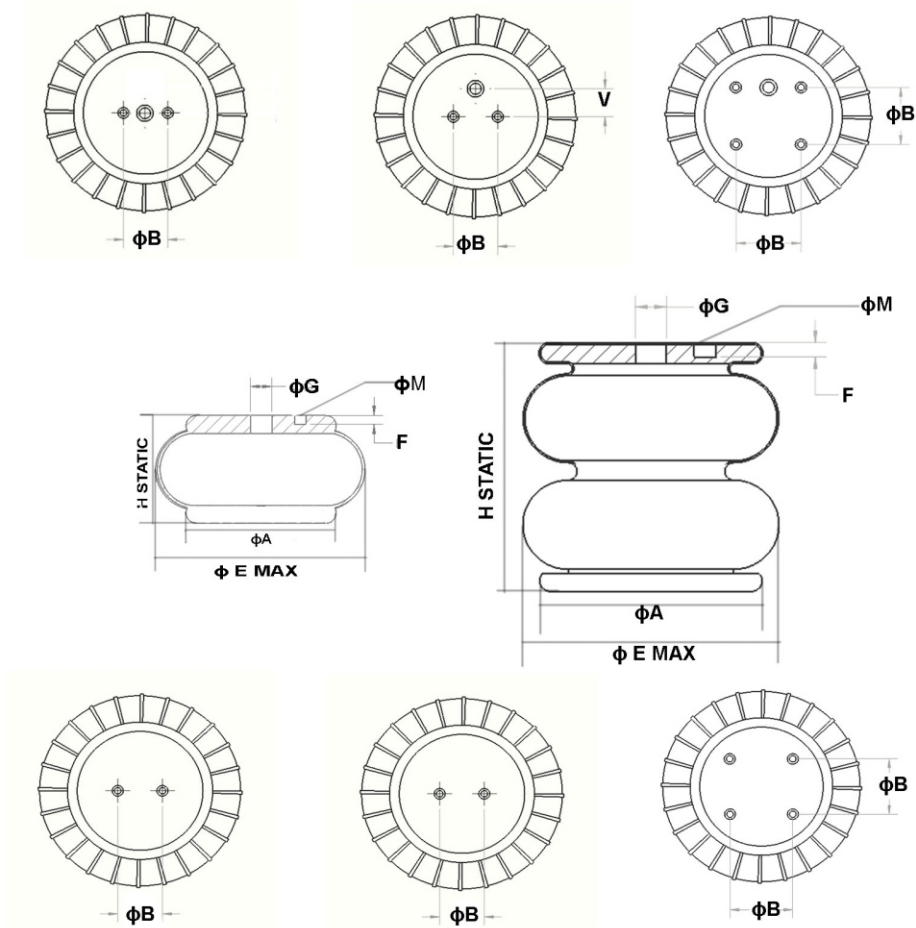


It is imperative that external mechanical stops are used to limit the stroke. The units should not achieve maximum stroke or be allowed to "bottom out".
Air Bellows may not be stacked, use singly only.

Industrial Air Springs

Mounting Dimensions

Series: VMCR, VSCR



SINGLE CONVOLUTION

ϕ	TYPES	H MIN	H STATIC	H MAX	MAX STROKE	ϕE STATIC	ϕE MAX	ϕA	ϕB	F	ϕM	ϕ PORT SIZE	V
150	6X1	50	80	105	55	153	175	108	44.5	15	M8	G1/4	0
200	8X1	50	90	125	75	204	230	141	70	15	M8	G1/4	0
250	10X1	50	100	150	100	254	280	161	89	15	M8	G1/4	38.1
300	12X1	50	100	150	100	305	330	228	157.5	15	M8	G1/2	73
380	15X1	51	145	175	124	385	400	287	158.8	15	M8	G1/2	79.4

DOUBLE CONVOLUTION

ϕ	TYPES	H MIN	H STATIC	H MAX	MAX STROKE	ϕE STATIC	ϕE MAX	ϕA	ϕB	F	ϕM	ϕ PORT SIZE	V
150	6X2	78	130	190	112	153	175	108	44.5	15	M8	G1/4	0
200	8X2	70	160	250	180	204	230	141	70	15	M8	G1/4	0
250	10X2	70	170	270	200	254	280	161	89	15	M8	G1/4	38.1
300	12X2	75	170	270	195	305	330	228	157.5	15	M8	G1/2	73
380	15X2	77	250	310	233	385	400	287	158.8	15	M8	G1/2	79.4


Industrial Air Springs

Air Springs Minimum and Maximum Volume

Ø	Types	Minimum volume (at 4 bar) cm ³	Maximum volume (at 4 bar) cm ³
80	3½ x 2	75	155
	3½ 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	2500
	6 x 3 (steel)	150	2500
200	8 x 1	300	2180
	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

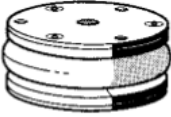

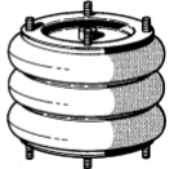
The maximum volume corresponds to the maximal height of the Air Bellow



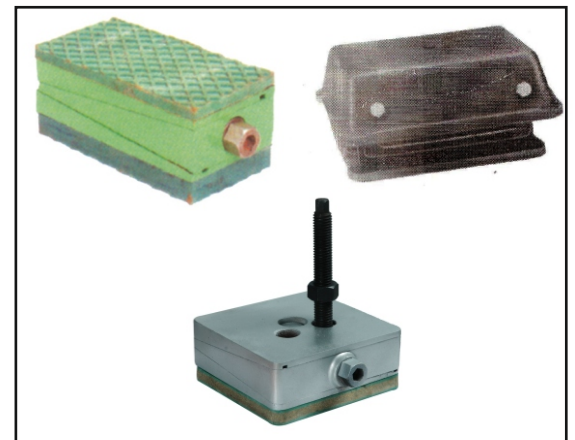
It is imperative that external mechanical stops are used to limit the stroke. The units should not achieve maximum stroke or be allowed to "bottom out".
Air Bellows may not be stacked, use singly only.

Industrial Air Springs

Product Order Code

Symbol	Diameter(mm)	Types	Port Size	Max Stroke mm	ORDER CODE BOLTED		ORDER CODE FLANGE			ORDER CODE CRIMPED	
					VMS	VSS	VFAL	VFMS	VFSS	VMCR	VSCR
 <p>One convolution</p>	110	4 1/2 x 1	G 3/8	45	///	///	VFAL41	VFMS41	VFSS41	///	///
	150	6 x 1	G 1/2	55	VMS61	VSS61	VFAL61	VFMS61	VFSS61	VMCR61	VSCR61
	200	8 x 1	G 1/2	75	VMS81	VSS81	///	VFMS81	VFSS81	VMCR81	VSCR81
	250	10 x 1	G 1/2	100	VMS101	VSS101	///	VFMS101	VFSS101	VMCR101	VSCR101
	300	12 x 1	G 1/2	100	VMS121	VSS121	///	VFMS121	VFSS21	VMCR121	VSCR121
	370	14 1/2 x 1	G 1/2	115	VMS141	VSS141	///	///	///	///	///
	400	15X1	G 1/2	120	///	///	///	///	///	VMCR151	VSCR151
 <p>Two convolutions</p>	80	3 1/2 x 2	G 1/4	50	///	///	VFAL32	///	///	///	///
	110	4.5 x 2	G 3/8	80	///	///	VFAL42	VFMS42	VFSS42	///	///
	150	6 x 2	G 1/2	120	VMS62	VSS62	VFAL62	VFMS62	VFSS62	VMCR62	VSCR62
	200	8 x 2	G 1/2	180	VMS82	VSS82	///	VFMS82	VFSS82	VMCR82	VSCR82
	250	10 x 2	G 1/2	200	VMS102	VSS102	///	VFMS102	VFSS102	VMCR102	VSCR102
	300	12 x 2	G 1/2	195	VMS122	VSS122	///	VFMS122	VFSS22	VMCR122	VSCR122
	370	14 1/2 x 2	G 1/2	225	VMS142	VSS142	///	///	///	VMCR142	VSCR142
	400	15 X 2	G 1/2	235	///	///	///	///	///	VMCR152	VSCR152
	410	16 X 2	G 1/2	250	VMS162	VSS162	///	///	///	///	///
	550	21 1/2 X 2	G 3/4	300	///	///	VFAL212	VFMS212	VFSS212	///	///
660	26 X 2	G 3/4	310	VMS262	VMS262	///	///	///	///	///	
 <p>Three convolutions</p>	80	3 1/2 x 3	G 1/4	65	///	///	VFAL33	///	///	///	///
	110	4.5 x 3	G 3/8	100	///	///	VFAL43	VFMS43	VFSS43	///	///
	150	6 x 3	G 1/2	180	VMS63	VSS63	VFAL63	VFMS63	VFSS63	VMCR63	VSCR63
	200	8 x 3	G 1/2	225	VMS83	VSS83	///	VFMS83	VFSS83	VMCR83	VSCR83
	250	10 x 3	G 1/2	300	VMS103	VSS103	///	VFMS103	VFSS103	VMCR103	VSCR103
	300	12 x 3	G 1/2	330	VMS123	VSS123	///	VFMS123	VFSS23	VMCR123	VSCR123
	370	14 1/2 x 3	G 1/2	350	VMS143	VSS143	///	///	///	VMCR143	VSCR43
	410	16 X 2	G 1/2	375	VMS163	VSS163	///	///	///	///	///
	550	21 1/2 X 3	G 3/4	300	///	///	VFAL213	VFMS213	VFSS213	///	///

Our Products



Air Jack





OTHER PRODUCT


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