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GAS SPRINGS

AZOL GAS

SLOWED RETURN VAM

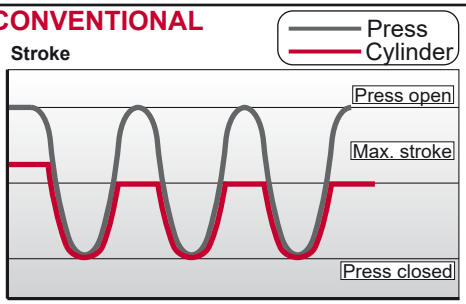
- Return stroke at a constant slowed speed
- Prevents blank holder bounce
- Compatible with ISO dimensions
- Increases productivity improving part transfer
- Cost saving compared to alternatives

AZOL GAS

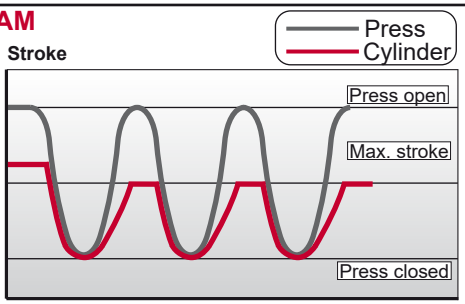
VAM *SLOWED RETURN*

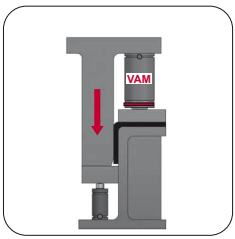
MODEL	F_0 daN / lb	Ø mm / inch	S mm / inch	L1 mm / inch	Pmax bar / psi	Charge Port		
VAM 300 V1	**300** *674*	**Ø45** *Ø1.77*	**25 - 100** *0.98 - 3.94*	**135 - 285** *5.31 - 11.22*	**150** *2175*	G1/8”	✔	✔
VAM 750	**750** *1686*	**Ø75** *Ø2.95*	**25 - 125** *0.98 - 4.92*	**160 - 360** *6.30 - 14.17*	**75** *1088*	G1/8”	✔	✔
VAM 1500	**1500** *3372*	**Ø95** *Ø3.74*	**25 - 125** *0.98 - 4.92*	**170 - 370** *6.69 - 14.57*	**75** *1088*	G1/8”	✔	✔
VAM 3000	**3000** *6744*	**Ø120** *Ø4.72*	**25 - 125** *0.98 - 4.92*	**190 - 390** *7.48 - 15.35*	**90** *1305*	G1/8”	✔	✔
VAM 5000	**5000** *11240*	**Ø150** *Ø5.91*	**25 - 125** *0.98 - 4.92*	**205 - 405** *8.07 - 15.94*	**100** *1450*	G1/8”	✔	✔
VAM 7500	**7500** *16861*	**Ø195** *Ø7.68*	**25 - 125** *0.98 - 4.92*	**210 - 410** *8.27 - 16.14*	**105** *1523*	G1/8”	✔	✔

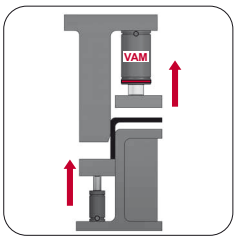
CONVENTIONAL



VAM





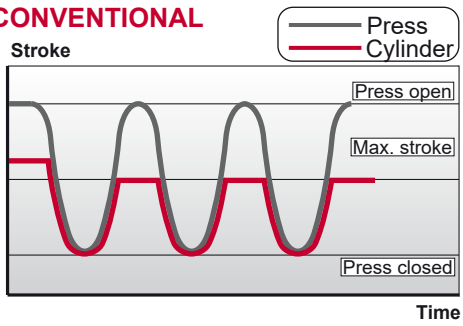


VAM gas spring meets the needs of applications requiring a **delayed return** of the rammer about the matrix.
VAM gas spring when returns to its initial position, the first mm backs at the same speed as a conventional gas spring, and subsequently slowed.

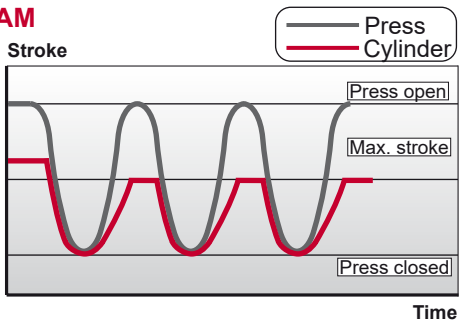
VAM SLOWED RETURN

AZOL GAS

CONVENTIONAL

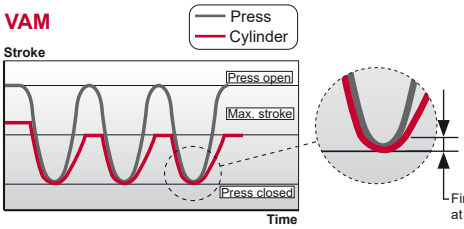


VAM



VAM gas springs are designed to return stroke at a constant slowed speed.

HOW IT WORKS



NOMINAL FORCE (daN)	CONSTANT (k)	MAXIMUM SLOWED RETURN (t_{max})
300	0.015	$t_{max} = k \times S_U$

EXAMPLE: VAM 300 080 (300 daN)

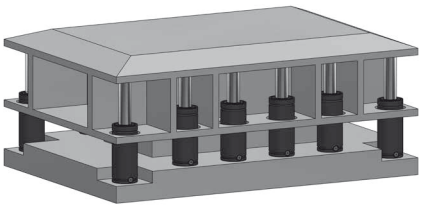
$t_{max} = k \times S_U = 0.015 \times 80 = 1,2$ seconds

Stroke used (S_U)

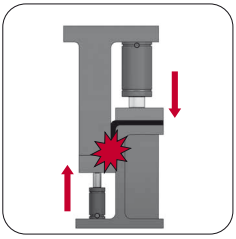
VAM gas spring when return to its initial position, the first mm backs at the same speed as a conventional gas spring and subsequently slowed.

Maximum slowed return stroke is defined to every model depending on used stroke.

APPLICATIONS



BLANK HOLDER BOUNCE



RAMMER RISE & MATRIX REMOVE

A) Increasing return speed in high speed presses (e.g. link drive presses) cause blank holder bounce back.

B) The ejector part starts working when the rammer is still holding it.

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VAM SLOWED RETURN

CHALLENGE AND SOLUTION

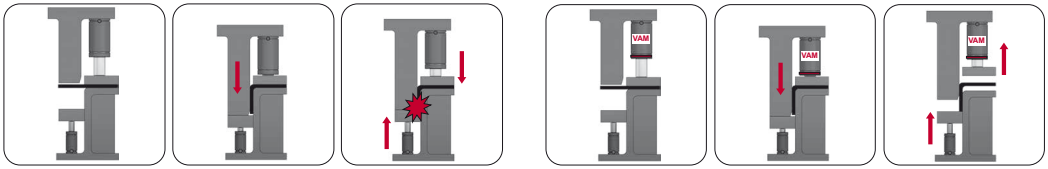
CHALLENGE: Blank holder bounce, difficult part transfer.

SOLUTION: VAM slow return piston rod eliminates blank holder bounce.

CHALLENGE AND SOLUTION

CHALLENGE

SOLUTION



CHALLENGE: Synchronized movement of rammer rise and removal of matrix causes deformation of metal part.

SOLUTION: VAM slowed return piston rod makes possible the removal of metal part without being deformed.

ADVANTAGES

- Prevents blank holder **bounce**.
- Increases **productivity**.
- **Easy** implementation.
- Use **self-contained** or **hosed**.
- Compatible with **ISO** dimensions.
- **Cost savings** to alternatives.

VAM SLOWED RETURN

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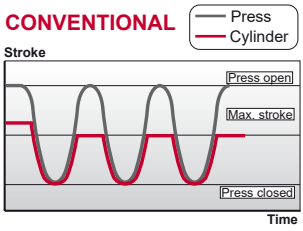
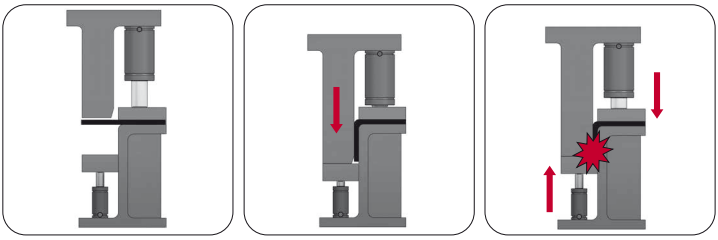
CHALLENGE

CONVENTIONAL

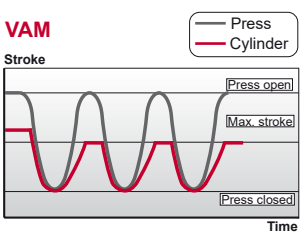


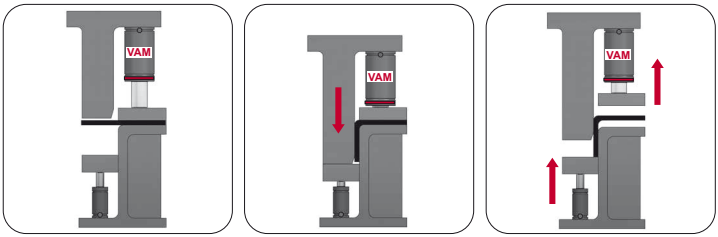


Certain operations involve the ejector piece begins to work when the rammer is still holding it. The use of conventional gas springs in these operations causes the **deformation of the metalsheet piece**.

SOLUTION

VAM





VAM when returns to its initial position, the first mm backs at the same speed as a conventional gas spring, and subsequently slowed, what makes possible the **removal of the metalsheet piece without deforming**.

REQUIRED DATA

- Do piston rod have to keep locked down? **(yes / no)**.....

- Desired force **(daN)**.....

- Total stroke **(mm)**.....

- Stroke used **(mm)**.....

- Number of cycles per minute.....

- Desired delay time **(eg. 1 second)**.....

- Stamping plant.....

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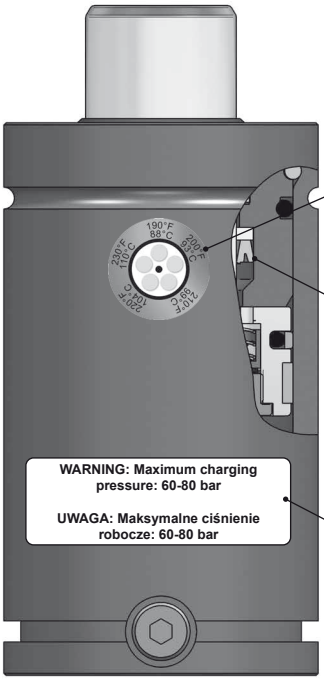
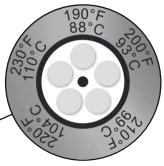
VAM SLOWED RETURN

VAM GAS SPRING

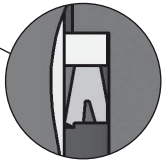


1 - THERMOMETER



VAM gas springs equipped with temperature thermometer.
If thermometer shows 3 out of 5 points in black color, the gas spring started becoming overheated

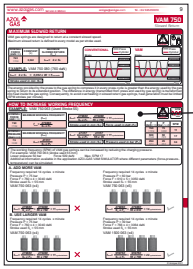
2 - HIGH TEMPERATURE SEALS



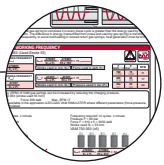
VAM gas springs equipped with high temperature seals

3 - LABELLING

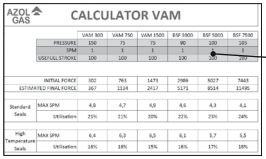
VAM gas springs labelled with max. pressure charge



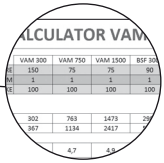
4 - CATALOGUE SPECIFICATION



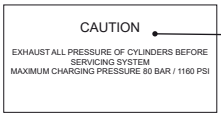
Examples to clarify how to increase working frequency.



5 - SIMULATOR



VAM gas springs application to simulate working conditions (pressure-force-temperature)



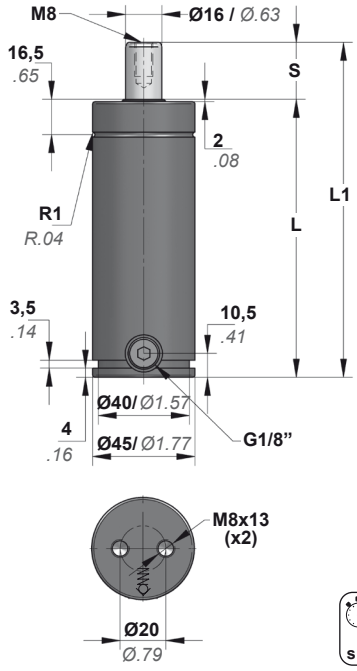
6 - DIE INFORMATION TAG

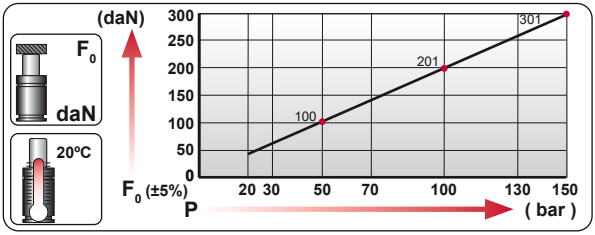
Die identification tag to show the maximum charging pressure to the end user when charging from control panel

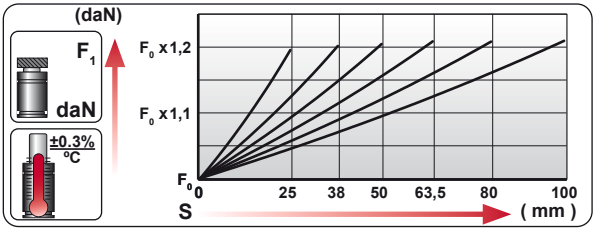
VAM 300 V1

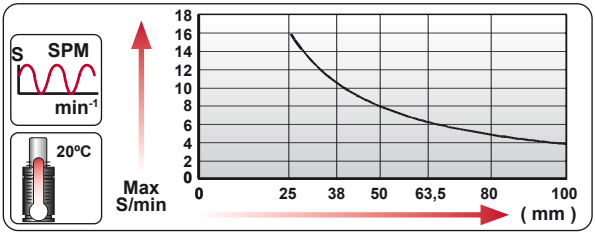
Slowed Return

AZOL GAS









VDI SAFETY > Vmax

STANDARDS PED

ORDER	S		L1 ±0.25		L		F_0 Initial Force		F_1 (ISOTHERMAL) End Force		Vol.			
	mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm^3	in^3	Kg.	lb
VAM 300 025 V1	25	0.98	135	5.31	110	4.33	300	674	359	807	31	1.9	1.04	2.29
VAM 300 038 V1	38	1.50	161	6.34	123	4.84	±5% 150 bar 2175 psi at 20ºC 68ºF		361	811	45	2.8	1.11	2.45
VAM 300 050 V1	50	1.97	185	7.28	135	5.31			362	813	59	3.6	1.17	2.58
VAM 300 063 V1	63.5	2.50	212	8.35	148.5	5.85			362	814	74	4.5	1.24	2.73
VAM 300 080 V1	80	3.15	245	9.65	165	6.50			363	815	93	5.7	1.33	2.93
VAM 300 100 V1	100	3.94	285	11.22	185	7.28			363	816	116	7.1	1.43	3.15

- Spring-back depending on used stroke.
- Return stroke at constant slowed speed.
- Prevent over-heating by limiting SPM.

MOUNTING OPTIONS

HOW TO ORDER

Drop-in

Top Mount

A14-045 581
A34-045 582

Base Mount

B21-045 590
B76-045 594

Foot Mount

C05-045 596
C20-045 598

Support Mount

D02-045 600
D67-045 602

TECHNICAL DATA

Fluid	N_2	Pmin Pmax 20ºC / 68ºF	20 bar 290 psi	150 bar 2175 psi	Charging Adapter	18 CG 1-Q
Smax	< 90%	Tmin Tmax	0 ºC 32 ºF	80 ºC 176 ºF	Connection	VAM-H 300 XXX V1
Vmax	0,5 m/s	Force variation by temperature	±0,3% / ºC		Cartridge Kit	1638E380N

AZOL GAS

VAM 300 V1
Slowed Return

MAXIMUM SLOWED RETURN

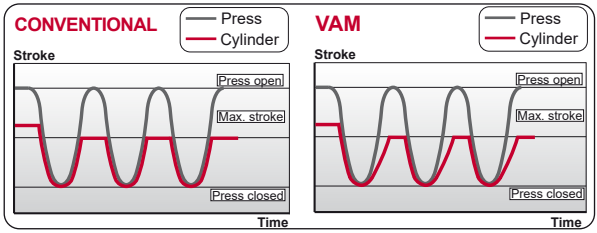
VAM gas springs are designed to return at a constant slowed speed.
Maximum slowed return is defined to every model as per stroke used.

NOMINAL FORCE (daN / *lb*)	CONSTANT (k)	MAXIMUM SLOWED RETURN (t_{max})
300 *674*	0.015	$t_{max} = k \times S_U$

EXAMPLE: VAM 300 080 V1 (300 daN)

$t_{max} = k \times S_U = 0.015 \times 80 = 1,2$ seconds

Stroke used in mm (S_U)



The energy provided by the press to the gas spring to compress it in every press cycle is greater than the energy used by the gas spring to return to its extended position. The difference in energy (transmitted from press and used by gas spring) is transformed into heat inside the gas spring. Consequently, to avoid overheating in slowed return gas springs, heat generation must be limited (SPM strokes per minute).

HOW TO INCREASE WORKING FREQUENCY

EXAMPLE: VAM 300 063 V1 (Used Stroke 55)

NOMINAL FORCE (daN / *lb*)	MAXIMUM WORKING FREQUENCY (f_{max})
300 *674*	$f_{max} = \frac{191952}{S_U \times F_U}$

$f_{max} = \frac{191952}{S_U \times F_U} = \frac{191952}{55 \times 300} = 11$ cycles/minute

Stroke used in mm (S_U) *Force used in daN (F_U)*

NOMINAL PRESSURE (bar / *psi*)	MAXIMUM WORKING FREQUENCY (f_{max})
150 *2175*	$f_{max} = \frac{95976}{S_U \times P_U}$

$f_{max} = \frac{95976}{S_U \times P_U} = \frac{95976}{55 \times 150} = 11$ cycles/minute

Stroke used in mm (S_U) *Pressure used in bar (P_U)*

WARNING! S SPM min⁻¹

F (daN / *lb*)	P (bar / *psi*)	SPM
300 *674*	150 *2175*	11
201 *452*	100 *1450*	17
161 *362*	80 *870*	21

The working frequency (SPM) of VAM gas springs can be increased by reducing the charging pressure.
For example: VAM 300 063 V1 (stroke used 55 mm)
Lower pressure 100 bar Force 201 daN Max. SPM 17
Additional information available in the application AZOLGAS VAM SIMULATOR where different parameters (force-pressure-temperature) can be simulated.

A. ADD MORE VAM

Frequency required 14 cycles x minute
Pressure P = 150 bar
Force F = 300 x 4 = 1200 daN
Stroke used S_U = 55 mm
VAM 300 063 (x4)

$f_{max} = \frac{191952}{S_U \times F_U} = \frac{191952}{55 \times 300} = 11$ cycles/minute ✗

Frequency required 14 cycles x minute
Pressure P = 120 bar
Force F = 240 x 5 = 1200 daN
Stroke used S_U = 55 mm
VAM 300 063 (x5)

$f_{max} = \frac{191952}{S_U \times F_U} = \frac{191952}{55 \times 240} = 14$ cycles/minute ✓

B. USE LARGER VAM

Frequency required 14 cycles x minute
Pressure P = 150 bar
Force F = 300 x 4 = 1200 daN
Stroke used S_U = 55 mm
VAM 300 063 (x4)

$f_{max} = \frac{191952}{S_U \times F_U} = \frac{191952}{55 \times 300} = 11$ cycles/minute ✗

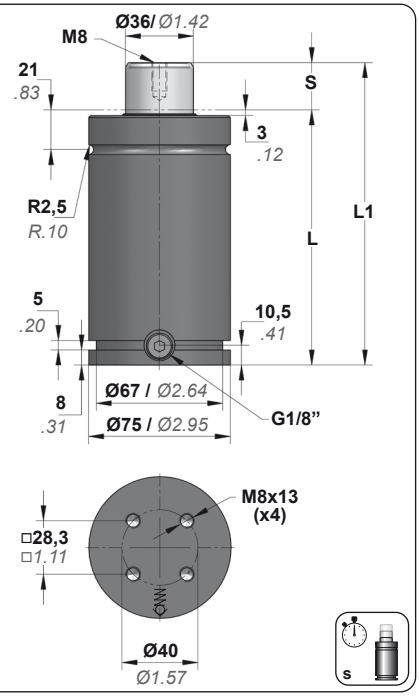
Frequency required 14 cycles x minute
Pressure P = 30 bar
Force F = 305 x 4 = 1220 daN
Stroke used S_U = 55 mm
VAM 750 063 (x4)

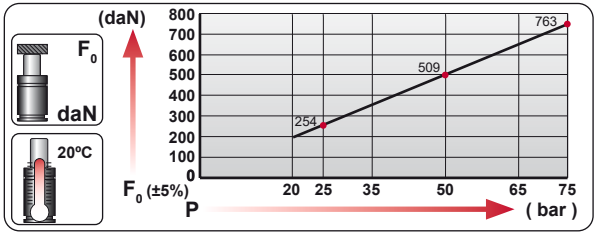
$f_{max} = \frac{479880}{S_U \times F_U} = \frac{479880}{55 \times 305} = 28$ cycles/minute ✓

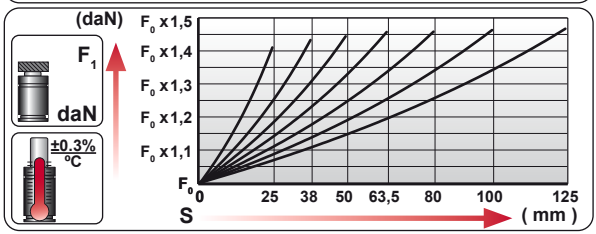
VAM 750

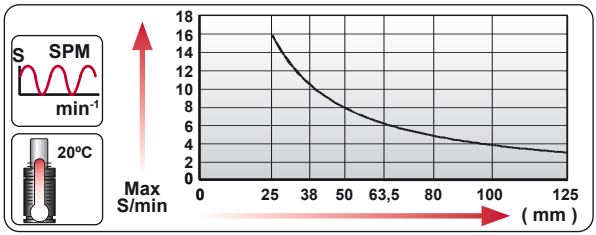
Slowed Return

AZOL GAS









VDI SAFETY > Vmax

STANDARDS APPROVED PED 2014/68/EU

ORDER	S		L1 ±0.25		L		F0 Initial Force		F1 (ISOTHERMAL) End Force		Vol.			
	mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm³	in³	Kg.	lb
VAM 750 025	25	0.98	160	6.30	135	5.31	760	1709	1073	2412	87	5.3	3.75	8.27
VAM 750 038	38	1.50	186	7.32	148	5.83	±5% 75 bar 1088 psi at 20ºC 68ºF		1090	2450	128	7.8	3.99	8.80
VAM 750 050	50	1.97	210	8.27	160	6.30			1098	2469	165	10.1	4.21	9.28
VAM 750 063	63.5	2.50	237	9.33	173.5	6.83			1104	2483	207	12.7	4.45	9.81
VAM 750 080	80	3.15	270	10.63	190	7.48			1109	2493	259	15.8	4.75	10.47
VAM 750 100	100	3.94	310	12.20	210	8.27			1113	2502	321	19.6	5.12	11.29
VAM 750 125	125	4.92	360	14.17	235	9.25			1116	2508	399	24.3	5.57	12.28

- Spring-back depending on used stroke.
- Return stroke at constant slowed speed.
- Prevent over-heating by limiting SPM.

MOUNTING OPTIONS

HOW TO ORDER

Drop-in

Top Mount — A14-075 581, A34-075 582

Base Mount — B21-075 590, B76-075 594

Foot Mount — C05-075 596, C20-075 598

Support Mount — D02-075 600, D67-075 602

TECHNICAL DATA

Fluid	N_2	Pmin Pmax 20ºC / 68ºF	20 bar 290 psi	75 bar 1088 psi	Charging Adapter: 18 CG 1-Q
Smax	< 90%	Tmin Tmax	0 ºC 32 ºF	80 ºC 176 ºF	Connection: VAM-H 750 XXX
Vmax	0,5 m/s	Force variation by temperature	±0,3% / ºC		Cartridge Kit: 3663R440M

AZOL GAS

VAM 750
Slowed Return

MAXIMUM SLOWED RETURN

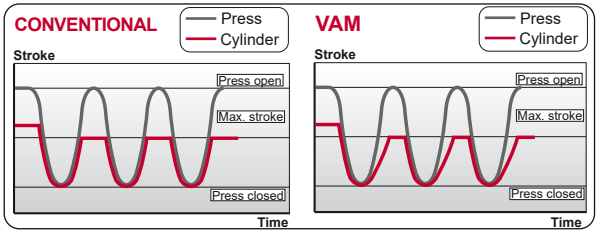
VAM gas springs are designed to return at a constant slowed speed.
Maximum slowed return is defined to every model as per stroke used.

NOMINAL FORCE (daN / lb)	CONSTANT (k)	MAXIMUM SLOWED RETURN (t_{max})
760 / 1709	0,062	$t_{max} = k \times S_U$

EXAMPLE: VAM 750 080 (760 daN)

$t_{max} = k \times S_U = 0{,}062 \times 80 = 5$ seconds

Stroke used in mm (S_U)



The energy provided by the press to the gas spring to compress it in every press cycle is greater than the energy used by the gas spring to return to its extended position. The difference in energy (transmitted from press and used by gas spring) is transformed into heat inside the gas spring. Consequently, to avoid overheating in slowed return gas springs, heat generation must be limited (SPM strokes per minute).

HOW TO INCREASE WORKING FREQUENCY

EXAMPLE: VAM 750 063 (Used Stroke 55)

NOMINAL FORCE (daN / lb)	MAXIMUM WORKING FREQUENCY (f_{max})
760 / 1709	$f_{max} = \frac{479880}{S_U \times F_U}$

$f_{max} = \frac{479880}{S_U \times F_U} = \frac{479880}{55 \times 760} = 11$ cycles/minute

Stroke used in mm (S_U) *Force used in daN (F_U)*

NOMINAL PRESSURE (bar / psi)	MAXIMUM WORKING FREQUENCY (f_{max})
75 / 1088	$f_{max} = \frac{47357}{S_U \times P_U}$

$f_{max} = \frac{47357}{S_U \times P_U} = \frac{47357}{55 \times 75} = 11$ cycles/minute

Stroke used in mm (S_U) *Pressure used in bar (P_U)*

F (daN / lb)	P (bar / psi)	SPM
760 / 1709	75 / 1088	11
509 / 1144	50 / 725	17
254 / 571	25 / 363	34

The working frequency (SPM) of VAM gas springs can be increased by reducing the charging pressure.
For example: VAM 750 063 (stroke used 55 mm)
Lower pressure 50 bar Force 509 daN Max. SPM 17
Additional information available in the application AZOLGAS VAM SIMULATOR where different parameters (force-pressure-temperature) can be simulated.

A. ADD MORE VAM

Frequency required 14 cycles x minute
Pressure P = 75 bar
Force F = 760 x 4 = 3040 daN
Stroke used S_U = 55 mm
VAM 750 063 (x4)

$f_{max} = \frac{479880}{S_U \times F_U} = \frac{479880}{55 \times 760} = 11$ cycles/minute ✗

Frequency required 14 cycles x minute
Pressure P = 60 bar
Force F = 610 x 5 = 3050 daN
Stroke used S_U = 55 mm
VAM 750 063 (x5)

$f_{max} = \frac{479880}{S_U \times F_U} = \frac{479880}{55 \times 610} = 14$ cycles/minute ✓

B. USE LARGER VAM

Frequency required 14 cycles x minute
Pressure P = 75 bar
Force F = 760 x 4 = 3040 daN
Stroke used S_U = 55 mm
VAM 750 063 (x4)

$f_{max} = \frac{479880}{S_U \times F_U} = \frac{479880}{55 \times 760} = 11$ cycles/minute ✗

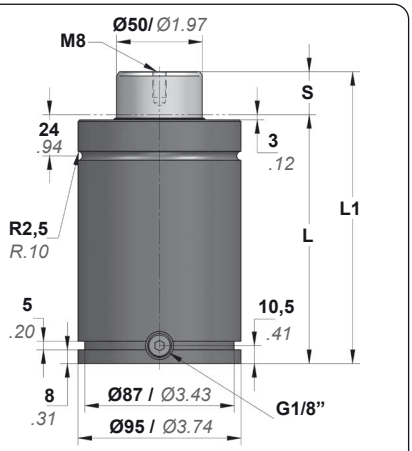
Frequency required 14 cycles x minute
Pressure P = 39 bar
Force F = 766 x 4 = 3064 daN
Stroke used S_U = 55 mm
VAM 1500 063 (x4)

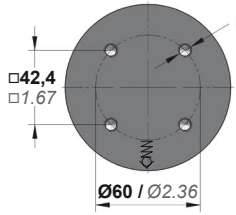
$f_{max} = \frac{959760}{S_U \times F_U} = \frac{959760}{55 \times 766} = 22$ cycles/minute ✓

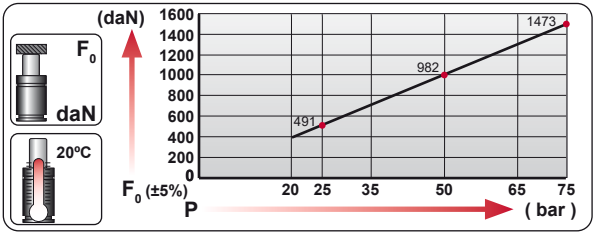
VAM 1500

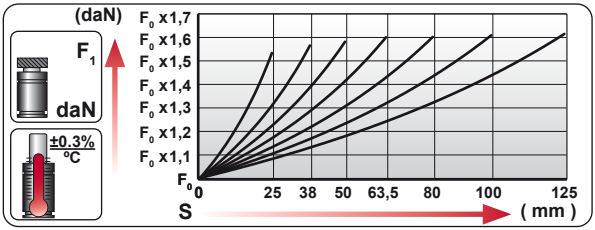
Slowed Return

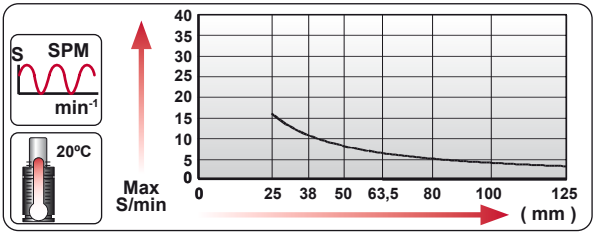
AZOL GAS











VDI SAFETY > Vmax

STANDARDS PED

ORDER	S		L1 ±0.25		L		F0 Initial Force		F1 (ISOTHERMAL) End Force		Vol.			
	mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm³	in³	Kg.	lb
VAM 1500 025	25	0.98	170	6.69	145	5.71	1470	3305	2257	5075	141	8.6	6.67	14.70
VAM 1500 038	38	1.50	196	7.72	158	6.22	±5% 75 bar 1088 psi at 20ºC 68ºF		2304	5180	206	12.6	7.08	15.61
VAM 1500 050	50	1.97	220	8.66	170	6.69			2328	5233	266	16.3	7.46	16.45
VAM 1500 063	63.5	2.50	247	9.72	183.5	7.22			2345	5271	334	20.4	7.89	17.39
VAM 1500 080	80	3.15	280	11.02	200	7.87			2358	5300	417	25.5	8.41	18.54
VAM 1500 100	100	3.94	320	12.60	220	8.66			2368	5324	518	31.6	9.04	19.93
VAM 1500 125	125	4.92	370	14.57	245	9.65			2377	5343	643	39.3	9.83	21.67

- Spring-back depending on used stroke.
- Return stroke at constant slowed speed.
- Prevent over-heating by limiting SPM.

MOUNTING OPTIONS

HOW TO ORDER

Drop-in

Top Mount

A14-095 581
A34-095 582

Base Mount

B21-095 590
B76-095 594

Foot Mount

C05-095 597
C20-095 598

Support Mount

D02-095 601
D67-603

TECHNICAL DATA

Fluid	N_2	Pmin Pmax 20ºC / 68ºF	20 bar 290 psi	75 bar 1088 psi	Charging Adapter: 18 CG 1-Q
Smax	< 90%	Tmin Tmax	0 ºC 32 ºF	80 ºC 176 ºF	Connection: VAM-H 1500 XXX
Vmax	0,5 m/s	Force variation by temperature	±0,3% / ºC		Cartridge Kit: 5080U460M

AZOL GAS

VAM 1500
Slowed Return

MAXIMUM SLOWED RETURN

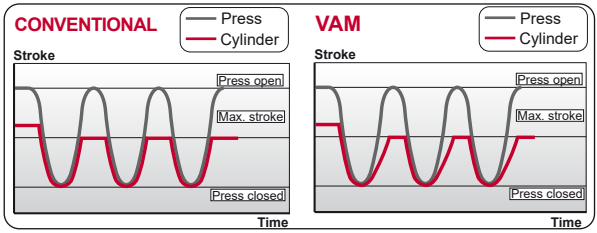
VAM gas springs are designed to return at a constant slowed speed.
Maximum slowed return is defined to every model as per stroke used.

NOMINAL FORCE (daN / *lb*)	CONSTANT (k)	MAXIMUM SLOWED RETURN (t_{max})
1470 *3305*	0,09	$t_{max} = k \times S_U$

EXAMPLE: VAM 1500 080 (1470 daN)

$t_{max} = k \times S_U = 0{,}09 \times 80 = 7$ seconds

Stroke used in mm (S_U)



The energy provided by the press to the gas spring to compress it in every press cycle is greater than the energy used by the gas spring to return to its extended position. The difference in energy (transmitted from press and used by gas spring) is transformed into heat inside the gas spring. Consequently, to avoid overheating in slowed return gas springs, heat generation must be limited (SPM strokes per minute).

HOW TO INCREASE WORKING FREQUENCY

EXAMPLE: VAM 1500 063 (Used Stroke 55)

NOMINAL FORCE (daN / *lb*)	MAXIMUM WORKING FREQUENCY (f_{max})
1470 *3305*	$f_{max} = \frac{959760}{S_U \times F_U}$

$f_{max} = \frac{959760}{S_U \times F_U} = \frac{959760}{55 \times 1470} = 11$ cycles/minute

Stroke used in mm (S_U) *Force used in daN (F_U)*

NOMINAL PRESSURE (bar / *psi*)	MAXIMUM WORKING FREQUENCY (f_{max})
75 *1088*	$f_{max} = \frac{48967}{S_U \times P_U}$

$f_{max} = \frac{48967}{S_U \times P_U} = \frac{48967}{55 \times 75} = 11$ cycles/minute

Stroke used in mm (S_U) *Pressure used in bar (P_U)*

F (daN / *lb*)	P (bar / *psi*)	SPM
1470 *3305*	75 *1088*	11
982 *2208*	50 *725*	17
491 *1104*	25 *363*	35

The working frequency (SPM) of VAM gas springs can be increased by reducing the charging pressure.
For example: VAM 1500 063 (stroke used 55 mm)
Lower pressure 50 bar Force 982 daN Max. SPM 17
Additional information available in the application AZOLGAS VAM SIMULATOR where different parameters (force-pressure-temperature) can be simulated.

A. ADD MORE VAM

Frequency required 14 cycles x minute
Pressure P = 75 bar
Force F = 1470 x 4 = 5880 daN
Stroke used S_U = 55 mm
VAM 1500 063 (x4)

$f_{max} = \frac{959760}{S_U \times F_U} = \frac{959760}{55 \times 1470} = 11$ cycles/minute ✗

Frequency required 14 cycles x minute
Pressure P = 60 bar
Force F = 1178 x 5 = 5890 daN
Stroke used S_U = 55 mm
VAM 1500 063 (x5)

$f_{max} = \frac{959760}{S_U \times F_U} = \frac{959760}{55 \times 1178} = 14$ cycles/minute ✓

B. USE LARGER VAM

Frequency required 14 cycles x minute
Pressure P = 75 bar
Force F = 1470 x 4 = 5880 daN
Stroke used S_U = 55 mm
VAM 1500 063 (x4)

$f_{max} = \frac{959760}{S_U \times F_U} = \frac{959760}{55 \times 1470} = 11$ cycles/minute ✗

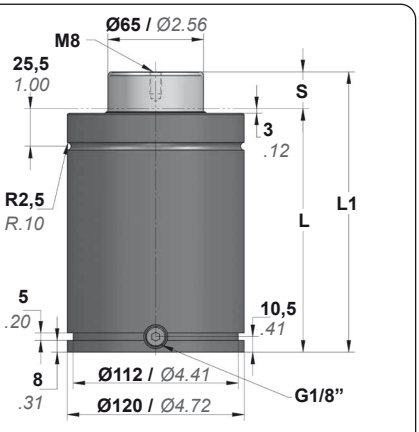
Frequency required 14 cycles x minute
Pressure P = 45 bar
Force F = 1493 x 4 = 5972 daN
Stroke used S_U = 55 mm
VAM 3000 063 (x4)

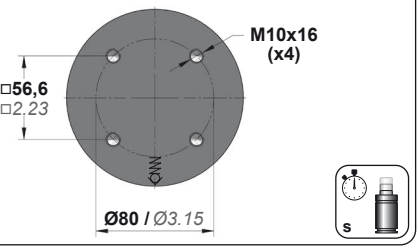
$f_{max} = \frac{1823544}{S_U \times F_U} = \frac{1823544}{55 \times 1493} = 22$ cycles/minute ✓

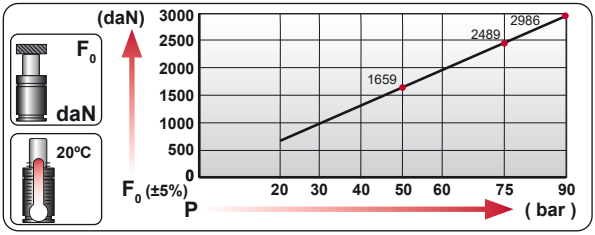
VAM 3000

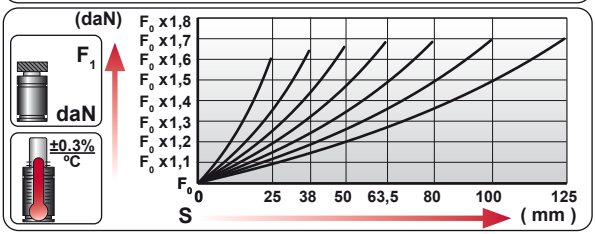
Slowed Return

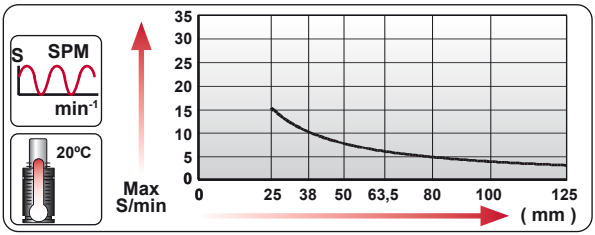
AZOL GAS











VDI SAFETY > Vmax

STANDARDS PED

ORDER	S		L1 ±0.25		L		F_0 Initial Force		F_1 (ISOTHERMAL) End Force		Vol.			
	mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm³	in³	Kg.	lb
VAM 3000 025	25	0.98	190	7.48	165	6.50	2985	6711	4793	10775	220	13.4	12.60	27.78
VAM 3000 038	38	1.50	216	8.50	178	7.01	±5% 90 bar 1305 psi at 20ºC 68ºF		4906	11030	322	19.7	13.29	29.30
VAM 3000 050	50	1.97	240	9.45	190	7.48			4963	11158	416	25.4	13.93	30.71
VAM 3000 063	63.5	2.50	267	10.51	203.5	8.01			5004	11249	522	31.9	14.64	32.28
VAM 3000 080	80	3.15	300	11.81	220	8.66			5036	11321	652	39.8	15.52	34.22
VAM 3000 100	100	3.94	340	13.39	240	9.45			5061	11378	809	49.4	16.59	36.57
VAM 3000 125	125	4.92	390	15.35	265	10.43			5082	11424	1005	61.3	17.91	39.48

- Spring-back depending on used stroke.
- Return stroke at constant slowed speed.
- Prevent over-heating by limiting SPM.

MOUNTING OPTIONS

HOW TO ORDER | Drop-in | Top Mount

A14-120	581	Base Mount	B21-120	591	Foot Mount	C05-120	597	Support Mount	D02-120	601
A34-120	583		B76-120	595		C20-120	599		D67-120	603

TECHNICAL DATA

Fluid	N_2	Pmin Pmax 20ºC / 68ºF	20 bar 290 psi	90 bar 1305 psi	Charging Adapter	18 CG 1-Q
Smax	< 90%	Tmin Tmax	0 ºC 32 ºF	80 ºC 176 ºF	Connection	VAM-H 3000 XXX
Vmax	0,5 m/s	Force variation by temperature	±0,3% / ºC		Cartridge Kit	65A0W560M

AZOL GAS

VAM 3000
Slowed Return

MAXIMUM SLOWED RETURN

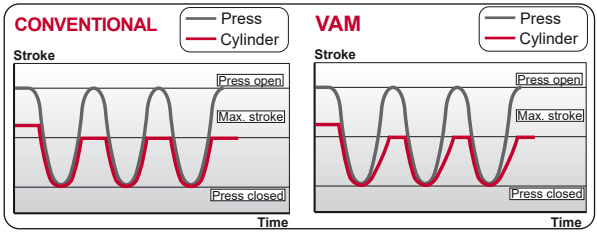
VAM gas springs are designed to return at a constant slowed speed.
Maximum slowed return is defined to every model as per stroke used.

NOMINAL FORCE (daN / lb)	CONSTANT (k)	MAXIMUM SLOWED RETURN (t_{max})
2985 / 6711	0,131	$t_{max} = k \times S_U$

EXAMPLE: VAM 3000 080 (2985 daN)

$t_{max} = k \times S_U = 0{,}131 \times 80 = 10$ seconds

Stroke used in mm (S_U)



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HOW TO INCREASE WORKING FREQUENCY

EXAMPLE: VAM 3000 063 (Used Stroke 55)

NOMINAL FORCE (daN / lb)	MAXIMUM WORKING FREQUENCY (f_{max})
2985 / 6711	$f_{max} = \frac{1823544}{S_U \times F_U}$

$f_{max} = \frac{1823544}{S_U \times F_U} = \frac{1823544}{55 \times 2985} = 11$ cycles/minute

Stroke used in mm (S_U) *Force used in daN (F_U)*

NOMINAL PRESSURE (bar / psi)	MAXIMUM WORKING FREQUENCY (f_{max})
90 / 1305	$f_{max} = \frac{54981}{S_U \times P_U}$

$f_{max} = \frac{54981}{S_U \times P_U} = \frac{54981}{55 \times 90} = 11$ cycles/minute

Stroke used in mm (S_U) *Pressure used in bar (P_U)*

F (daN / lb)	P (bar / psi)	SPM
2985 / 6711	90 / 1305	11
2489 / 5595	75 / 1088	13
1659 / 3730	50 / 725	20

The working frequency (SPM) of VAM gas springs can be increased by reducing the charging pressure.
For example: VAM 3000 063 (stroke used 55 mm)
Lower pressure 75 bar Force 2489 daN Max. SPM 13
Additional information available in the application AZOLGAS VAM SIMULATOR where different parameters (force-pressure-temperature) can be simulated.

A. ADD MORE VAM

Frequency required 13 cycles x minute
Pressure P = 90 bar
Force F = 2985 x 4 = 11940 daN
Stroke used S_U = 55 mm
VAM 3000 063 (x4)

$f_{max} = \frac{1823544}{S_U \times F_U} = \frac{1823544}{55 \times 2985} = 11$ cycles/minute ✗

Frequency required 13 cycles x minute
Pressure P = 72 bar
Force F = 2389 x 5 = 11945 daN
Stroke used S_U = 55 mm
VAM 3000 063 (x5)

$f_{max} = \frac{1823544}{S_U \times F_U} = \frac{1823544}{55 \times 2389} = 13$ cycles/minute ✓

B. USE LARGER VAM

Frequency required 13 cycles x minute
Pressure P = 90 bar
Force F = 2985 x 4 = 11940 daN
Stroke used S_U = 55 mm
VAM 3000 063 (x4)

$f_{max} = \frac{1823544}{S_U \times F_U} = \frac{1823544}{55 \times 2985} = 11$ cycles/minute ✗

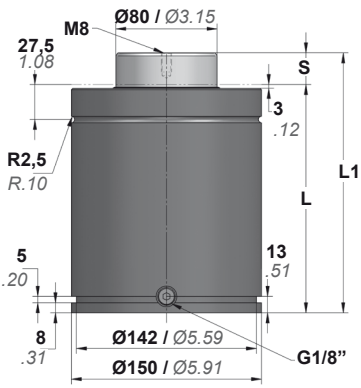
Frequency required 13 cycles x minute
Pressure P = 60 bar
Force F = 3016 x 4 = 12064 daN
Stroke used S_U = 55 mm
VAM 5000 063 (x4)

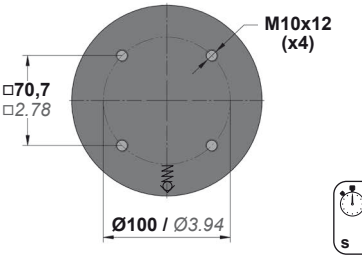
$f_{max} = \frac{2879280}{S_U \times F_U} = \frac{2879280}{55 \times 3016} = 17$ cycles/minute ✓

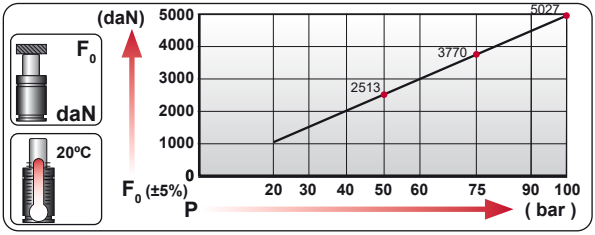
VAM 5000

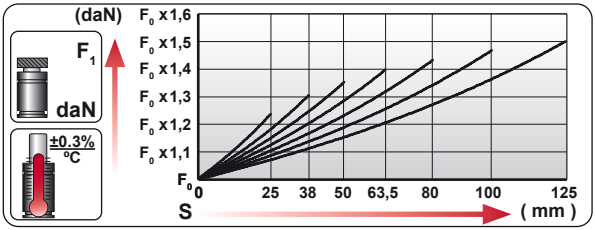
Slowed Return

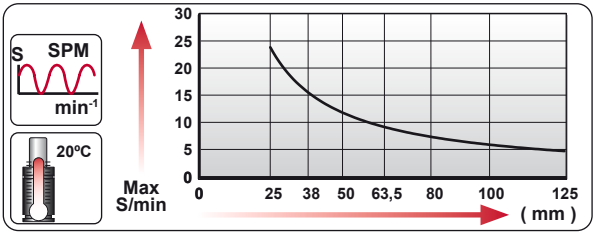
AZOL GAS











VDI SAFETY > Vmax

STANDARDS PED

ORDER	S		L1 ±0.25		L		F_0 Initial Force		F_1 (ISOTHERMAL) End Force		Vol.			
	mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm³	in³	Kg.	lb
VAM 5000 025	25	0.98	205	8.07	180	7.09	5025	11297	7922	17810	344	21.0	19.22	42.37
VAM 5000 038	38	1.50	231	9.09	193	7.60	±5% 100 bar 1450 psi at 20ºC 68ºF		8100	18210	503	30.7	20.27	44.69
VAM 5000 050	50	1.97	255	10.04	205	8.07			8190	18411	650	39.7	21.25	46.85
VAM 5000 063	63.5	2.50	282	11.10	218.5	8.60			8253	18553	816	49.8	22.34	49.25
VAM 5000 080	80	3.15	315	12.40	235	9.25			8303	18666	1019	62.2	23.68	52.20
VAM 5000 100	100	3.94	355	13.98	255	10.04			8343	18755	1264	77.1	25.30	55.78
VAM 5000 125	125	4.92	405	15.94	280	11.02			8375	18828	1571	95.9	27.32	60.23

- Spring-back depending on used stroke.
- Return stroke at constant slowed speed.
- Prevent over-heating by limiting SPM.

MOUNTING OPTIONS

HOW TO ORDER

Drop-in

Top Mount

A14-150 581
A34-150 583

Base Mount

B21-150 591
B76-150 595

Foot Mount

C05-150 597
C20-150 599

Support Mount

D02-150 601
D67-150 603

TECHNICAL DATA

Fluid	N_2	Pmin Pmax 20ºC / 68ºF	20 bar 290 psi	100 bar 1450 psi	Charging Adapter: 18 CG 1-Q
Smax	< 90%	Tmin Tmax	0 ºC 32 ºF	80 ºC 176 ºF	Connection: VAM-H 5000 XXX
Vmax	0,5 m/s	Force variation by temperature	±0,3% / ºC		Cartridge Kit: 80C5X700M

AZOL GAS

VAM 5000
Slowed Return

MAXIMUM SLOWED RETURN

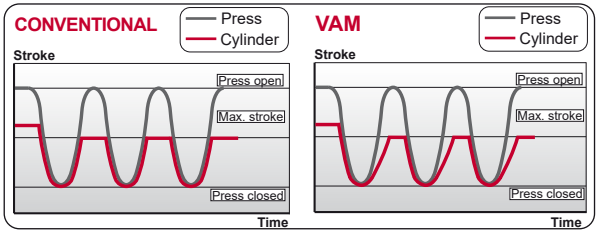
VAM gas springs are designed to return at a constant slowed speed.
Maximum slowed return is defined to every model as per stroke used.

NOMINAL FORCE (daN / *lb*)	CONSTANT (k)	MAXIMUM SLOWED RETURN (t_{max})
5025 *11297*	0.214	$t_{max} = k \times S_U$

EXAMPLE: VAM 5000 080 (5025 daN)

$t_{max} = k \times S_U = 0.214 \times 80 = 17$ seconds

Stroke used in mm (S_U)



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HOW TO INCREASE WORKING FREQUENCY

EXAMPLE: VAM 5000 063 (Used Stroke 55)

NOMINAL FORCE (daN / *lb*)	MAXIMUM WORKING FREQUENCY (f_{max})
5025 *11297*	$f_{max} = \frac{2879280}{S_U \times F_U}$

$f_{max} = \frac{2879280}{S_U \times F_U} = \frac{2879280}{55 \times 5025} = 10$ cycles/minute

Stroke used in mm (S_U) *Force used in daN (F_U)*

NOMINAL PRESSURE (bar / *psi*)	MAXIMUM WORKING FREQUENCY (f_{max})
100 *1450*	$f_{max} = \frac{57299}{S_U \times P_U}$

$f_{max} = \frac{57299}{S_U \times P_U} = \frac{57299}{55 \times 100} = 10$ cycles/minute

Stroke used in mm (S_U) *Pressure used in bar (P_U)*

F (daN / *lb*)	P (bar / *psi*)	SPM
5025 *11297*	100 *1450*	10
4021 *9040*	80 *1160*	13
3016 *6780*	60 *870*	17

The working frequency (SPM) of VAM gas springs can be increased by reducing the charging pressure.
For example: VAM 5000 063 (stroke used 55 mm)
Lower pressure 80 bar Force 4021 daN Max. SPM 13
Additional information available in the application AZOLGAS VAM SIMULATOR where different parameters (force-pressure-temperature) can be simulated.

A. ADD MORE VAM

Frequency required 13 cycles x minute
Pressure P = 100 bar
Force F = 5025 x 4 = 20100 daN
Stroke used S_U = 55 mm
VAM 5000 063 (x4)

$f_{max} = \frac{2879280}{S_U \times F_U} = \frac{2879280}{55 \times 5025} = 10$ cycles/minute ✗

Frequency required 13 cycles x minute
Pressure P = 78 bar
Force F = 3920 x 5 = 19600 daN Stroke used S_U = 55 mm
VAM 5000 063 (x5)

$f_{max} = \frac{2879280}{S_U \times F_U} = \frac{2879280}{55 \times 3920} = 13$ cycles/minute ✓

B. USE LARGER VAM

Frequency required 13 cycles x minute
Pressure P = 100 bar
Force F = 5025 x 4 = 20100 daN
Stroke used S_U = 55 mm
VAM 5000 063 (x4)

$f_{max} = \frac{2879280}{S_U \times F_U} = \frac{2879280}{55 \times 5025} = 10$ cycles/minute ✗

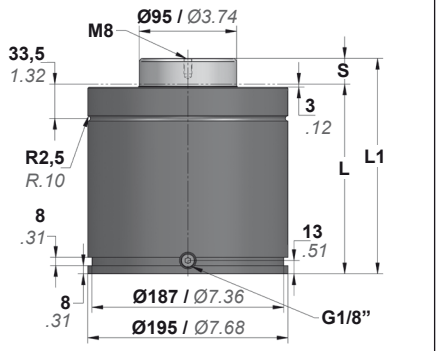
Frequency required 13 cycles x minute
Pressure P = 70 bar
Force F = 4962 x 4 = 19847 daN
Stroke used S_U = 55 mm
VAM 7500 063 (x4)

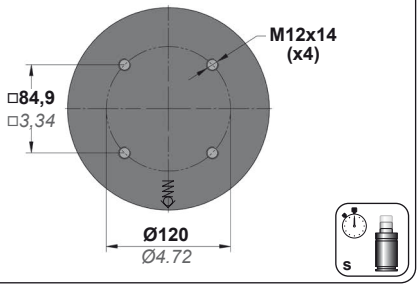
$f_{max} = \frac{4078980}{S_U \times F_U} = \frac{4078980}{55 \times 4962} = 14$ cycles/minute ✓

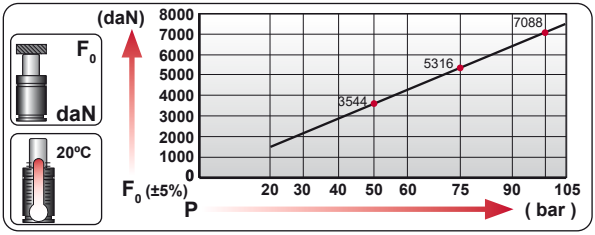
VAM 7500

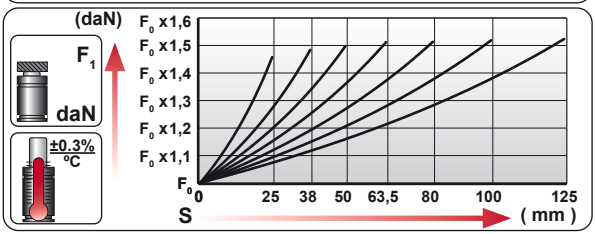
Slowed Return

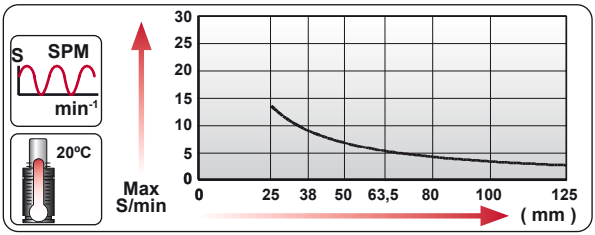
AZOL GAS











VDI SAFETY > Vmax

STANDARDS APPROVED PED 2014/68/UE

ORDER	S		L1 ±0.25		L		F_0 Initial Force		F_1 (ISOTHERMAL) End Force		Vol.			
	mm	inch	mm	inch	mm	inch	daN	lb	daN	lb	cm³	in³	Kg.	lb
VAM 7500 025	25	0.98	210	8.27	185	7.28	7440	16726	10858	24409	563	34.4	37.02	81.61
VAM 7500 038	38	1.50	236	9.29	198	7.80			11051	24843	824	50.3	38.74	85.41
VAM 7500 050	50	1.97	260	10.24	210	8.27			11147	25061	1066	65.0	40.33	88.91
VAM 7500 063	63.5	2.50	287	11.30	223.5	8.80			11216	25214	1337	81.6	42.12	92.86
VAM 7500 080	80	3.15	320	12.60	240	9.45			11269	25334	1669	101.8	44.30	97.66
VAM 7500 100	100	3.94	360	14.17	260	10.24			11312	25430	2071	126.4	46.94	103.48
VAM 7500 125	125	4.92	410	16.14	285	11.22			11346	25507	2574	157.1	50.25	110.78

±5% 105 bar 1520 psi at 20ºC 68ºF

- Spring-back depending on used stroke.
- Return stroke at constant slowed speed.
- Prevent over-heating by limiting SPM.

MOUNTING OPTIONS

HOW TO ORDER

Drop-in

Top Mount: A14-195 581, A34-195 583

Base Mount: B21-195 591, B76-195 595

Foot Mount: C05-195 597, C20-195 599

Support Mount: D02-195 601

TECHNICAL DATA

Fluid	N_2	Pmin Pmax 20ºC / 68ºF	20 bar 290 psi	105 bar 1520 psi	Charging Adapter: 18 CG 1-Q
Smax	< 90%	Tmin Tmax	0 ºC 32 ºF	80 ºC 176 ºF	Connection: VAM-H 7500 XXX
Vmax	0,5 m/s	Force variation by temperature	±0,3% / ºC		Cartridge Kit: 95G0Y840M

AZOL GAS

VAM 7500
Slowed Return

MAXIMUM SLOWED RETURN

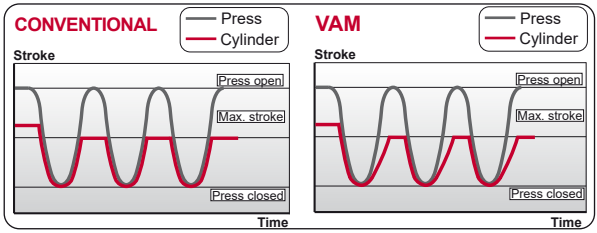
VAM gas springs are designed to return at a constant slowed speed.
Maximum slowed return is defined to every model as per stroke used.

NOMINAL FORCE (daN / lb)	CONSTANT (k)	MAXIMUM SLOWED RETURN (t_{max})
7440 / 16726	0,289	$t_{max} = k \times S_U$

EXAMPLE: VAM 7500 080 (7440 daN)

$t_{max} = k \times S_U = 0{,}289 \times 80 = 23$ seconds

Stroke used in mm (S_U)



The energy provided by the press to the gas spring to compress it in every press cycle is greater than the energy used by the gas spring to return to its extended position. The difference in energy (transmitted from press and used by gas spring) is transformed into heat inside the gas spring. Consequently, to avoid overheating in slowed return gas springs, heat generation must be limited (SPM strokes per minute).

HOW TO INCREASE WORKING FREQUENCY

EXAMPLE: VAM 7500 063 (Used Stroke 55)

NOMINAL FORCE (daN / lb)	MAXIMUM WORKING FREQUENCY (f_{max})
7440 / 16726	$f_{max} = \frac{4078980}{S_U \times F_U}$

$f_{max} = \frac{4078980}{S_U \times F_U} = \frac{4078980}{55 \times 7440} = 10$ cycles/minute

Stroke used in mm (S_U) *Force used in daN (F_U)*

NOMINAL PRESSURE (bar / psi)	MAXIMUM WORKING FREQUENCY (f_{max})
105 / 1520	$f_{max} = \frac{57566}{S_U \times P_U}$

$f_{max} = \frac{57566}{S_U \times P_U} = \frac{57566}{55 \times 105} = 10$ cycles/minute

Stroke used in mm (S_U) *Pressure used in bar (P_U)*

F (daN / lb)	P (bar / psi)	SPM
7440 / 16726	105 / XXX	10
5671 / 12749	80 / 1160	13
4253 / 9561	60 / 870	17

The working frequency (SPM) of VAM gas springs can be increased by reducing the charging pressure.
For example: VAM 7500 063 (stroke used 55 mm)
Lower pressure 80 bar Force 5671 daN Max. SPM 13
Additional information available in the application AZOLGAS VAM SIMULATOR where different parameters (force-pressure-temperature) can be simulated.

A. ADD MORE VAM

Frequency required 12 cycles x minute
Pressure P = 105 bar
Force F = 7440 x 4 = 29760 daN
Stroke used S_U = 55 mm

VAM 7500 063 (x4)

$f_{max} = \frac{4078980}{S_U \times F_U} = \frac{4078980}{55 \times 7440} = 10$ cycles/minute ✗

Frequency required 12 cycles x minute
Pressure P = 84 bar
Force F = 5954 x 5 = 29770 daN
Stroke used S_U = 55 mm

VAM 7500 063 (x5)

$f_{max} = \frac{4078980}{S_U \times F_U} = \frac{4078980}{55 \times 5954} = 12$ cycles/minute ✓