Landalucía, 7 - P.I. Júndiz 01015 Vitoria / Spain +34 945 290 010 azolgas@azolgas.com www.azolgas.com

GAS SPRINGS

AZOL GAS

FREQUENTLY ASKED QUESTIONS

- Gas Springs Basic Theory
- Operating instructions
- Safety on use
- PED Regulation

AZOL GAS

INDEX

FREQUENTLY ASKED QUESTIONS

AZOL GAS

WHAT IS A GAS SPRING

1. What is a gas spring?
A gas spring is a container charged with Nitrogen gas at a high pressure (150-210 BAR) / (2175-3045 PSI) that has a mobile part (piston rod) used to transmit an effort (force).

2. How a gas spring works?
When the piston rod is pushed down with higher force than the pressurized gas, then the piston rod is inserted into the body compressing the gas and increasing the force progressively. When the effort on the piston rod ends, the pressurized gas push up the piston rod till its initial position.

3. What the gas springs are used for?
Gas springs are used to obtain a force (either a compression force, or a traction force).
The force obtained is used to support weights to hold pieces or to absorb impacts.
Gas springs are used to regulate an effort: if the effort pushed on the gas spring is lower than the nominal force of the gas spring, it keeps static, but in case the effort pushed on the gas spring is higher than its nominal force then it is compressed and increase its force. This allow to use a controlled effort without adjusting the movement of the tool where the gas springs are installed.

4. What are the advantages of using gas springs vs coil springs?
Reduction of height, surface used and volumen occupied. Considerable reduction of height used for equivalent forces and strokes. More compact tool construction. No need of pre-load devices. Force balanced on every contact point. Force to be positioned exactly where demanded on the tool. Checking the pressure and control the production conditions during the metal forming operations. Better quality on metal sheet pieces, reduction of scrap and maximize productivity. Adequate the gas springs to the forces needed. Use the same gas springs for different production requirements. If using coil springs, the breakage of coil springs may cause the broken parts to be laid on the tool surface what would damage it in the next press cycle. On the contrary, gas springs when failing or leaking gas no spare part is causing damage on the tool surface.

5. Which are the main industrial areas where the gas springs are used?
Gas springs can be used in all the industrial applications where a controlled effort (force regulation) must be used in a repetitively way.
The main industrial applications are focused in metal sheet stamping, in metal forming press shops (automotive industry, electronic appliances).
Gas springs are also used in plastic mould injection tools.

AZOL GAS

FREQUENTLY ASKED QUESTIONS

6. The same gas spring can be used for different applications?
Gas springs are used interchangeably for different applications (cutting operations, bending operations or piercing operations). Gas springs are a kind of general elastic components that can be used for whatever application as long as the manufacturer operating instructions are followed.
Some of the automotive standards prescribe the use of specific gas springs for specific metal forming operations.

7. How to make the right choice of a gas spring?
To make the right choice of gas springs, the following technical parameter are used: Force / Stroke / Size / Diameter / Strokes per minute / Hosed systems.
In addition, it should be taken into account the type of fastening of the gas spring and the working conditions (presence of fluids, guiding, side loads & non perpendicular forces).

8. How many gas springs should be used on each tool? Gas springs installed into the tool should always be pairs to keep balanced the forces?
The number of gas springs used in a tool is determined by the effort needed to achieve the operation the tool has been designed for. To get the best performance of gas springs it is advisable the distribution of forces on the tool to be the most balanced as possible, but it is not necessary the gas springs to be in pairs.

9. How must be calculated the number of gas springs to be used in the application?
Engineering offices that design the tools usually define the force needed in the application. Depending on the function of the gas springs in the tool (stripper, cam return or slider, blank holder, tool separation) it is defined the total effort to be made by gas springs, and it is made the choice of the total number of gas springs that provide with the required total effort. In addition, another 2 tehcnical data are considered: Stroke / Size.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

PARTS OF A GAS SPRING

10. What is the main function of each gas spring spare part?

Piston rod. Mobile part of gas spring (it is compressed and it returns to its initial position).
Body. It is the container of gas.
Cartridge. Guides the piston rod enabling to work perpendicularly.
Locking ring. Fastens the cartridge to the body.
Protector. Avoid particles to be inserted into the gas spring (between the cartridge and the body).
Wiper. Avoid particles to be inserted into the gas spring (between the cartridge and the piston rod).
Sleeve. Self-lubricated part, improve guiding and reduce the piston rod friction.
Guide. Guides the piston rod inside the body.
O.ring. Seals the gas (in static) between outside the cartridge and inside the body.
Gasket. Seals the gas (in dynamic) between inside the cartridge and the piston rod.
Valve. Lets load and drain the gas in/out the gas spring.
Sealing plug. Protects the filling port and the filling valve.

Not all the gas springs share the whole components here detailed.

11. Which are critical spare parts in the right performance of a gas spring?

Regarding the potential leaking points, the critical parts are those that seal the gas and keep under constant wearing:

O. Ring
Gasket
Valve

FOR ALL GAS SPRINGS (Gas springs sealing the gas against piston rod surface)

Piston rod, because any scratch on its surface may cause leaks.
Body, because is the container with gas at a high pressure.

FOR CS SERIES (Gas spirngs sealing the gas against inside body surface)

Body, because is the container with gas at a high pressure and seals the gas against its internal surface.

12. What is the protective cover for the piston rod of gas springs? What it is used for?

AZOLGAS supplies the gas springs with a cover on the piston rod that protects against humidity and potential damages on its surface.

To remove the protective cover push only on the piston rod top hole and avoid piercing the piston rod side surface, it will damage the the piston rod surface.

AZOL GAS

FREQUENTLY ASKED QUESTIONS

13. Which treatments are used in the gas springs manufacturing?

FOR ALL THE GAS SPRINGS

Body.

Hardness: It is predefined by the treatment incorporated to the raw material selected.

Roughness: Precision machining inside the surface to achieve the roughness required.

Oxidation: Black oxide, to prevent oxidation (black color).

Piston rod.

Hardness: Surface hardness is achieved by Nitriding treatment.

Roughness: Precision Polishing (super-finishing) to get the roughness desired.

Oxidation: Nitriding to prevent also from oxidation.

FOR CS SERIES

Body.

Hardness: Nitriding to achieve on the body the hardness required.

Roughness: Polishing the interior surface to get the roughness desired.

Oxidation: Nitriding used prevent also from oxidation.

Piston rod.

Hardness: Surface hardness is obtained by Nitriding.

Roughness: Precision Polishing to get the adequate roughness.

Oxidation: Nitriding used prevent also from oxidation.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

CHARGING

14. Why the gas springs can only be filled with N2? Another different type of gas could be used?
Nitrogen gas is used as long as keeps an optimal performing when compressing, in addition it is an inert, no reactive, no polluting, and abundant gas. The use of other fluids is not permitted.

15. What do I need to fill a gas spring with N2?
A nitrogen gas bottle with a minimum pressure of 150 BAR. Should be the pressure in the nitrogen gas bottle inferior to 150 BAR, a Nitrogen Booster DBNA or a new nitrogen gas bottle with higher pressure than 150 BAR must be used. From the nitrogen gas bottle, gas spring filling is made by pressure balance, that is why it is necessary a pressure in the bottle higher than the pressure required to fill the gas spring.
Additonally a Charging Unit EC 37, a set of a pressure regulator (control the pressure of the nitrogen gas bottle and the pressure ot the gas spring), a hose and filling adapters (for each type of cylinder or control panel).
A Filling & Control Unit A 400 C may be also used.

16. What is the filling pressure of the gas springs?
Each model of gas spring is charged to a defined pressure, check in the corresponding catalog sheet. In general gas springs are charged to the predefined pressure showed in the catalog, should be required a different pressure it is necessary to specify it (only between minimum and maximum pressure admitted).

17. Which are the different Charging Units available?
There are 2 main models of Charging Units: EC37-EC39.
EC37 a set of pressure regulator LTH 600 + hose + release valve + quick coupling + gas springs filling adapters.
EC39 a set of hose + quick coupling filling adapters.
As long as it has no pressure regulator, a gauge to verify the pressure must be used (either through a control panel in hosed systems or Filling & Control Unit A 400 C in self-contained gas springs).

18. Once the gas spring is charged up to desired pressure, Do I have to drain the Load Unit hose?
Yes, otherwise the Charging Unit could not be unthreaded from the gas spring. Gas springs are equipped with a one-way valve that prevents from gas leak when decoupling the hose, but the remaining gas in the hose is risky for the operator.

19. The nitrogen bottles use the same threads worldwide?
NO, nitrogen gas bottle threads are different from some countries to other ones.
Each country needs an adapter to fit the Charging Unit EC37-EC39 to the nitrogen gas botttle. (i.e. female thread W21.7-14H). AZOLGAS can supply the corresponding adapter.

AZOL GAS

FREQUENTLY ASKED QUESTIONS

20. How many types of filling adapters are used to fill the gas springs?
It depends on the filling port thread of each gas spring:

Filling port gas springs	M6	use charging adapter	06 CG 2-Q
Filling port gas springs	G1/8	use charging adapter	18 CG 1-Q

21. How to know what is the filling adapter used on each gas spring?
In the corresponding catalog sheet related to each gas spring model (right inferior side).

22. AZOLGAS filling adapters may be used to fill gas springs from other competitors?
Although the filling ports threads are usually the same (M6-M8-G1/8”), the filling port grooves and filling valves used by each manufacturer may be different. Original adapters from manufacturer are always recommended to be used.

23. How many different filling valves are used in the gas springs?
Two main types of filling valves:

DIN 7757	Used in most of the gas springs.
XTC-M6	Used in compact size gas springs (it has smaller size than DIN 7757).

24. How to know what is the filling valve used in each gas spring?
It is defined and supplied in the repair kit. Each gas spring is laser etched on the body with its corresponding serial number and repair kit number.

25. Gas springs can be filled with the piston rod inserted into the cylinder?
NO, never fill a gas spring when the piston rod is not fully extended.
The impact of sudden pressure may cause structural damages in the gas spring.

26. Gas springs can be manipulated when charged with N2?
NO, before whatever manipulation on the gas spring, it is absolutely necessary to unload it completely.
It is allowed to transport the gas spring charged with gas but without any manipulation.

27. How to make sure the gas springs are fully discharged?
To make sure the gas spring is totally discharged it should be possible to insert the piston rod by hand and stay in this position.

28. What about if when filling the gas spring the pressure reached is over the maximum allowed?
Maximum allowed charging pressure for each gas spring must not be exceeded. In case of exceeding the maximum allowed pressure proceed immediately to discharge it till the maximum pressure allowed before using the gas spring.
A charging pressure superior to the maximum pressure allowed involves a risk of premature wearing on structural elements of the gas spring (body), and a risk of premature wearing on sealing elements of the gas spring (o.ring, gasket and filling valve).

FREQUENTLY ASKED QUESTIONS

AZOL GAS

29. What about if when filling the gas spring the pressure reached is under the minimum allowed?
Below 20 BAR the gaskets (sealing elements) may not seal the gas in dynamic properly. It is always advise to charge the gas springs between the minimum and maximum allowed.

30. What is the DBNA Nitrogen Booster used for?
It is used to profit at maximum the nitrogen gas bottles. When the nitrogen gas bottles have no pressure enough to charge a gas spring (below 150 BAR), the booster let profit the gas from the nitrogen gas bottle to a minimum of 20 BAR.

31. DBNA booster is profitable?
Users with a high consumption of nitrogen gas bottles may profit of DBNA booster, depending on monthly/annual consumption of bottles and the cost of nitrogen gas for them.

AZOL GAS

FREQUENTLY ASKED QUESTIONS

DRAINING

32. What are the risks of manipulating the gas springs without being fully drained?
There will no way to disassembling the gas spring, and if attempting to disassemble some of the mentioned parts without being fully drained, there will be a high risk of potential accident. Attempt to disassemble the filling valve when the gas spring is charged may cause the valve to be expelled with a high risk of potential accident.
Before discharging the gas spring point the gas flow away from operator or anybody else.
Gas springs maintenance must be carried out only by skilled personnel in a closed and protected area, with the appropriate tools and protection, and following the operating and service instructions from AZOLGAS.

33. May be drained a gas spring without taking off the sealing plug?
NO, the first step to drain a gas spring is to unscrew the sealing plug.
Although the sealing plug may also seal the gas, its main purpose is to protect the filling valve from any impact or wrong manipulation.

34. Are there any series of gas springs with more than 1 sealing plug?
Yes, the gas springs with double filling port: i.e. series AGB-H are equipped with double filling port for double direct hose, positioned at 180º. This type of gas spings let a direct connection from cylinder to cylinder without using T adapters. Warning: gas springs with double filling port are not equipped with filling valve, should attempted to unscrew the sealing plug when charged with nitrogen gas it may cause to be expelled with a high risk of accident. Draining of double filling port gas springs must be done through the control panel.

35. Why the gas springs must be drained downside?
To prevent the lubricating oil inside to be expelled outside the gas spring.
All the AZOLGAS gas springs able to be used in connected systems are designed in such a way the oil keeps inside the cylinder when attempting to drain the gas.

36. Why the gas springs must be drained slowly?
Becaused in case of sudden drainage it may damage the filling valve.

37. Specific draining tools must be used, or another tools could be used: i.e. screwdriver?
For safety reasons, it is necessary always to use the tools mentioned on the Manual for Servicing gas springs for each service operation.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

38. What are the risks of draining the gas springs without the specific draining tools?
May be the gas springs will be not drained, or not fully drained, or the filling valve will be damaged (become unuseful, become stuck or being expelled).

39. How we should proceed if the filling valve is broken and do not let us drain the gas spring?
It is recomended to follow the outlined operating instructions from the manufacturer and to contact with the manufacturer (AZOLGAS) o its nearby distributor. In case of draining by own user, it must be followed the Manual for Servicing gas springs operating instructions related to drilling the gas spring body.

40. How many draining tools are used?
There is only one model of draining tool A 550 1/8-M6 that is used to drain all the AZOLGAS gas springs.
A single tool with double thread, on one side M6 and the other side 1/8".

PRESSURE

41. What is the pressure of a gas spring related to?
It depends on the quantity of gas inserted into the gas spring.

42. It is the same question the pressure of a gas spring and the force of a gas spring?
No, it is not the same.
The pressure is determined by the quantity of gas inserted into the gas pring. The most usual units to measure the pressure are: BAR – PSI – PASCAL.
The force of a gas spring is minimum effort necessary to start moving the piston rod. The force is determined by the product of the pressure and the section where the gas is sealed in dynamic. The most usual units to measure the force are: daN – Kgs – lbs.

43. May a gas spring with lower pressure achieve higher force than other one with higher pressure?
Yes, for instance AFB 50 050 (charged with 180 bar gets an initial force F0 of 50 daN), but AFC 100 050 (charged with 90 bar gets an initial force F0 of 100 daN). It depends on the sealing section where the gas is sealed in dynamic.

44. If using the same gas spring, the higher pressure, the higher force?
Yes, the chart on top right catalog sheet shows for the same gas spring, the lineal relation between the pressure increase and its corresponding force increase.

45. How is the relation in a gas spring between the pressure and the force?
The force is determined by the product of the pressure and the section where the gas is selaed in dynamic. For example, for a gas spring with a sealing section on the piston rod with a diameter of 2,5 cm, and charged with a pressure of 150 bar, its force is:

$$\frac{\pi x(2,5)^2}{4} x\ 150 = 736,3\ daN = 7363\ N$$

The higher is the section where the gas is sealed in dynamic, the higher is the force of the gas spring.

46. All the gas springs have the same sealing section? All of them seal the gas in the same point?
No, each model of gas spring is designed with an specific surface where the gas is sealed in dynamic.
There are 2 types of gas springs in terms of the sealing section:
-Gas is sealed in dynamic on the piston rod surface (all the gas springs except CS).
-Gas is sealed in dynamic on the internal surface of the body (CS series).
In order to calculate the force for most of the gas springs, it is necessary to take into account the piston rod diameter.
But to calculate the force for the gas springs CS, it is necessary to take into account the diameter of the internal surface of the body.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

47. What is the filling pressure of gas springs?
The filling pressure of the gas spring is indicated in its corresponding catalog sheet for each model of gas spring.
Should be charged the gas spring to the mentioned pressure in the catalog sheet, the initial force showed in the catalog sheet is obtained.

48. What is the maximum filling pressure of gas springs?
The maximum charging pressure is indicated on the laser etching body of each gas spring, and it can be also checked in the corresponding catalog sheet.

49. What is the minimum filling pressure of gas springs?
Below 20 BAR (290 PSI) the gaskets (sealing elements) may not seal the gas in dynamic properly.
It is always recommended to charge the gas springs between the minimum and maximum pressure allowed.

50. What are the consequences of using a gas spring with overpressure?
A higher pressure than the maximum pressure allowed involves on the one hand, a risk of premature wearing on the structural parts of the gas spring (body), and on the other hand, a risk of premature wearing on the sealing elements of the gas spring (o.ring, gasket and valve).

51. What is the pressure rise factor in gas springs, where to find it in the catalog?
The chart on central right catalog sheet for each gas spring model shows the compression rate (or the force increase in relation to the stroke used), that is to say, the relation between the initial force and the final force for each working stroke used.
For example in the gas spring AFB 13 050 V1, its initial force F0 is 13 daN and its final force F1 is 20 daN (1,6 according to the catalog sheet chart).
The compression rate is a pressure rise factor that represents how much is multiplied the initial force (and the initial pressure) when the nominal stroke is used.

52. How to check the pressure in a gas spring?
In self-contained gas spirngs (not connected systems), A 400 C can be used to check the pressure (see operating instructions on the Manual for Servicing gas springs). Everytime a pressure checking is made on a self-contained gas spring, a small portion of gas leaks from the gas spring to the Filling & Control unit A 400 C and then the gas is drained when the checking pressure finish. Should be made several times checking of pressure on small size gas springs, it may cause a significant pressure dicrease on the gas spring. That is why is not recommended to used repeatedly the Filling & Control unit A 400 C to check the pressure on gas springs series MINI.
In connected gas springs systems, the pressure of the circuit can be checked on the gauge of the control panel.

53. When to check the pressure in a gas spring?
According to the BOYLE-MARIOTTE's Law, for a fixed volumen if the temperature increases the pressure increases as well. Within the temperature range of use of a gas spring, for each degree increase in temperature, the pressure increases by about 0,3%.
That is why is recommended only to check the gas springs pressure when they are at a room temperature (20ºC).

FORCE

54. How to know about the force in a gas spring?
AZOLGAS gas springs part numbers are easily identified as per technical parameters: i.e. AFC 100 050 (AFC = model; 100 = force; 050 = stroke). The mentioned part number codification (Model – Force – Stroke) is also showed in lower left part of the catalog sheet.
The part number code is also indelible marked on the gas spring body.
The nominal force is showed in daN (tens of Newtons) or kgs.

55. How to check the force in a gas spring?
To check the force of a gas spring Test units (BDP 5 and BDP 10) must be used (see Manual for Servicing gas springs).

56. What is the force tolerance admitted when filling gas springs?
The standard tolerance of the initial force F0 when charging gas springs is + 0% to + 5%.

57. Gas springs force is reduced after being used for a period of time?
The micro-leaks in gas springs after being used if properly installed as per AZOLGAS operating instructions should not be significant.

58. The force of gas springs change according to the temperature of use?
Yes, according to the BOYLE-MARIOTTE's Law, for a fixed volumen if the temperature increases the pressure increases as well. Within the temperature range of use of a gas spring, for each degree increase in temperature, the pressure increases by about 0,3%.
That is why is recommended only to check the gas springs force when they are at a room temperature (20ºC).

STROKE

59. What is the maximum % of the stroke to be used in gas springs?
Although 100% of nominal stroke may be used, it is recommended use a maximum of 90% of nominal stroke to make sure the best performance of gas springs and prevent risks of over-stroke.

60. What are the consequences of using 100% of the stroke in gas springs?
The main consequence is a higher wearing on sealing elements what in turn reduce the life expectancy of the gas springs. The end part of the stroke is where the maximum pressure and temperature is reached, what means higher wearing on the sealing elements.

61. What are the consequences of using more than 100% of the stroke in gas springs?
If using more than 100% of gas spring nominal stroke and safety, the press start pushing the body surface and it becomes deformed (due to the fact that it is a container charged with gas a high pressure, the risk of potential breakage is very high and it represents a high risk for safety).

FREQUENCY

62. What is the frequency?
The working frequency is usually estimated in cycles per minute (strokes per minute: 1 stroke = a complete press cycle down/up of the piston rod).

63. What is the maximum working frequency of gas springs? Where to find it in the catalog?
The maximum working frequency is defined in the corresponding catalog sheet for each gas spring model and each stroke used (see lower right chart on catalog sheet).
The more stroke used, the lower working frequency admitted.

64. Why a longer stroke used involves a lower working frequency of gas springs?
Because a longer stroke involves higher friction what in turns cause higher temperature (gas springs maximum operating temperature is 80ºC). The frequency is limited by the temperature reached in the gas spring. Balanced temperature is reached when the heat caused in the gas spring by the friction is equal than the heat the gas spring is able to disipate from its surface.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

SPEED

65. It is the same question the working frequency and the working lineal speed of gas springs?
No, the frequency is related to the working frequency (cycles x minute): i.e. 5 cycles per minute, on the other hand, the lineal speed is related to the movement speed of the piston rod throughout the seals (meters x second): i.e. 1,6 meters per second.
A gas spring may has a very high working frequency (50 cycles per minute) but a very low lineal speed (0,2 meters per second); on the contrary, may has a very low working frequency (5 cycles per minute) but a very high lineal speed (2 meters per second).

66. What is the maximum operating lineal speed admitted in gas springs?
Each gas spring model has specified its own maximum working lineal speed.
Most of gas springs have a maximum working lineal speed of 1,6 meters per second, CP-CPH-CS series are limited up to 0,5 meters per second.

67. Are there gas spring series allowed to operate at a higher lineal speed?
Yes, AG-AGB-H series are designed to operate up to 2 meters per second working lineal speed.

68. What is the freely release of the piston rod in gas springs?
It is the case when the piston rod moves up till its initial position without any contact with the element that has compressed it. This involves that all the energy accumulated by the gas push up the piston rod at a higher speed than the maximum speed the gas spring is designed to.

69. Why the piston rod freely release cause damage in gas springs?
Because the sudden impact of the piston rod on the cartridge may cause damage on structural elements of the gas spring (body, cartridge, piston rod).

AZOL GAS

FREQUENTLY ASKED QUESTIONS

SPEED CONTROL

70. Which systems are used to control the speed of gas springs?
There are 2 main types of speed control systems related to the piston rod way back once compressed:
-Slow return gas springs (piston rod return back only slow but never stops)
-Speed controlled gas springs (piston rod return back starts and stops when required)

71. How a smooth return of the piston rod is achieved in gas springs?
To achieve a smooth return of the piston rod, VAM slow return gas springs may be used (see brochure).

72. How a controlled return of the piston rod is achieved in gas springs?
To achieve a speed control of the piston rod, BSF gas springs may be used (see brochure).

FREQUENTLY ASKED QUESTIONS

AZOL GAS

TEMPERATURE

73. What is the maximum working temperature of gas springs?
Following the operating instructions, gas springs should not operate over 80ºC.
It is necessary to take into account that the temperature of the gas springs increase when working, that is why the maximum working temperature is not referred only to the working environment temperature.

74. What are the consequences of operating gas springs over the maximum working temperature?
From 80ºC up the sealing elements start loosing their sealing properties, wearing, and finally causing premature leaks.

GAS SPRINGS LIFE EXPECTANCY

75. What is the life expectancy of gas springs?

There are 2 types of guarantee about gas springs life expectancy:

- Durability of structural elements (body, cartridge and piston rod)
- Durability of sealing elements (change of seals)

The structural elements of gas springs (body, cartridge and piston rod) are design to bear a minimum of 2,000,000 cycles fatigue resistance:

- For any specified flange mounting
- At the highest pressure allowed
- With the maximum allowable temperature

The change of sealing elements is related to the stroke used (the longer stroke the lower life expectancy). In ideal working conditions and following the operating instructions, the seals are designed to achieve a life expectancy up to 2.000.000 cycles for gas springs with ≤ 50 mm stroke, and 200.000 lineal meters for gas springs with > 50 mm stroke.

In order to translate the lineal meters into cycles just it is necessary to know the working stroke of the gas spring, i.e. for a stroke of 125 mm an ISO gas spring should had the following life expectancy:

- 125 mm x 2 (down and up) = 250 mm = 0,25 meter
- 200.000 lineal meters / 0,25 meters = 800.000 cycles

76. What are the consequences of using gas springs over the estimated life expectancy?

Wearing of sealing parts (seals and valve) cause leaks in the gas spring, loosing pressure and working force. If there is no additional irregular wearing in structural parts (body, cartridge, piston rod), just by changing the sealing elements (repair kit) the gas spring can be used again.

Nevertheless AZOLGAS recommends replacing the gas springs by new ones after 2.000.000 cycles or 10 years.

WARNING: the use of gas springs more over the maximum life expectancy (2.000.000 cycles) estimated for the structural elements (body, cartridge and piston rod) might cause high safety risks.

European Directive 2014/68 EU prescribes requalification of pressure equipement devices (gas springs) after 8 or 10 years from start servicing. The mentioned requalification must be carried out by appointed auditor and submit the pressure equipment devices (gas springs) to the opportune pressure test.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

77. Which are the main factors related to the gas springs life expectancy?

The main factors about gas springs life expectancy are:

- Stroke used
- Charging pressure
- SPM (strokes per minute)

The following causes that affect to the performance of the gas springs has been identified:

- Protection. (Applications with presence of fluids or particles).
- Perpendicularity. (Applications non perpendicular or side loads).
- Temperature. (Applications at a high temperature or high friction).
- Lineal speed. (Applicaction at a high speed).

For each one of the mentioned working conditions AZOLGAS designed technical solutions that let increase the life expectancy of the gas springs in spite of demanding working conditions. See Manual for Servicing gas springs and specific brochures with special technical solutions.

SAFETY

78. Safety devices are available in gas springs?

Yes, AZOLGAS count on several safety devices on gas springs:

- In case of over-stroke.
- To prevent the impact of the piston rod freely release.
- In case of over-pressure.

AZOLGAS gas springs safety devices fulfill CNOMO / VDI safety requirements.

AZOLGAS gas springs equipped with CNOMO / VDI safety devices are supplied with indelible marking and specific label to be identified.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

REGULATION

79. What is the PED 2014/68 EU Directive?
It is a European Directive harmonizing in the whole European Union the regulation of pressure vessels manufactured or sold in the European Union. Additionally each country has its own transposition regulation of the mentioned Directive.

80. PED 2014/68 EU Directive regulation is related to all the gas springs?
All the gas springs manufactured or sold in the European Union, as pressure equipment devices are submitted to the Directive PED 2014/68 EU.
Depending on the product of the pressure x volume, Directive PED 2014/68 EU classify the pressure equipment devices, the main categories for gas springs are:

- Category I volume > 1 liter and product of pressure x volume > 50 < 200 bar x liter
- Category II volume > 1 liter and product of pressure x volume > 200 bar x liter
- Category III volume > 1 liter and product of pressure x volume > 1000 bar x liter

Those gas springs below the mentioned categories are submitted to the Article 4.3., Directive PED 2014/68 EU.

81. What PED 2014/68 EU Directive involves to the manufacturer of pressure vessels?
Directive PED 2014/68 EU regulation affects the design, the manufacturing and the evaluation of conformity of the pressure equipment devices (i.e. gas springs).
As a summary:
-Design the pressure devices to make sure its safety during its life expectancy scheduled.
-Make sure the material used meet the specifications required in the Directive PED 2014/68 EU.
-Manufacture the pressure devices according to specifications detailed when designed.
-Mark the pressure devices following the Directive PED 2014/68 EU guidelines.
-Submit the pressure devices to the process of conformity evaluation required.
-Provide to the user documentation about the safety operating instructions of pressure devices.
-Supply the Declaration of Conformity to the Directive when required.

82. What PED 2014/68 EU Directive involves to the end user of pressure vessels?
The end user of gas springs is responsable to fullfil the regulation of the country where used.
The legal framework usually contains the following questions:
-Acknowledge receipt of documentation from manufacturer.
-Get ready for inspection the documentation while the devices are on use.
-Servicing the pressure devices according to manufacturer's operating instructions.
-Make regular inspections to the devices (visual inspection and requalification).

AZOL GAS

FREQUENTLY ASKED QUESTIONS

ASSEMBLING & DISASSEMBLING

83. What process should be followed to assemble and disassemble gas springs?
See the Manual for Servicing gas springs. Make sure the gas spring is fully drained.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

REPAIR

84. What process should be followed to repair gas springs?
See the Manual for Servicing gas springs. Make sure the gas spring is fully drained.

85. All the gas springs can be repaired?
Most of the gas spring can be repaired, but the following series cannot be repaired:
AFB V2-AFH V1-AFJ V1-AFK V1-AFD V1-AF V1-AFT V1-CK200 V1-CK300 V1-CT200 V1-CT300 V1-CW170 V1 -CW320 V1-CP 150 V1 and all the models from series CP-CPH-CSE.
Information available for each model on the catalog.

86. When the maintenance and repair of gas springs must be made?
Although strictly there is no preventive maintenance scheduled for gas springs, it is recommended to change the sealing elements every 2.000.000 cycles for gas springs with strokes ≤ 50 mm, and every 200.000 lineal meters for strokes > 50 mm.

MOUNT SYSTEMS

87. Which are the mount systems for gas springs?
Mounts are used to fix or fasten the gas spring to the tool where its incorporated.
If properly installed, the mounts let the correct perpendicular support of the piston rod to the working surface, and prevent from side loads that may reduce its life expectancy.

88. Gas springs may be installed into a bored pockets?
Yes, provided that the conditions described in the catalog:

- Groove diameter must be < 1 mm in relation to the gas spring diameter.
- Groove height must be > 80% of gas spring body height.
- The bottom of the gas spring body should be supported at all the times.
- Groove must be provided with adequate drainage.

89. Why the bottom surface of gas springs should be supported at all the times?
100% of the gas springs base must be always supported on a uniform and flat surface in order to prevent structural damages on gas springs.
Special warning about this requirement for CS gas springs series.

90. Gas springs may be fixed to the tool by the top piston rod thread?
NO, the thread on the top of the piston rod is only intended to be used when servicing the gas springs (see installation examples on the catalog).

91. Gas springs may be fixed to the tool by the bottom thread filling port?
NO, it is not recommended.

92. Gas springs may be fixed to the tool by the bottom threads?
The use of bottom threads to fix gas springs to the tool only by using screws is not recommended.
Do not fix the MINI and Compact Height series (CW) to the tool only by using screws at the bottom (due to their smaller guiding section deviation of perpendicularity affects more to these gas springs series).

93. Lower groove in MINI gas springs can be used to fix mounts to the tool?
NO, the use of lower groove to fix mounts in MINI gas springs series is only allowed strokes < 25 mm.

94. Gas springs may be used without being fixed in any way to the tool?
NO, it is only admitted the installation of gas springs with the appropriate mounts and following the operating instructions explained in the Catalog and Manual for Servicing gas springs.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

PIPING SYSTEMS

95. What are the linked gas springs systems?
Linked systems are circuits that let the connection of the gas springs into the tool.

96. What the gas springs linked systems are used for?
The circuits are used to:

- Control the pressure of all the gas springs linked (from a control panel).
- Keep the same pressure in all the gas springs linked.
- Obtain the same force in all the gas springs linked with similar technical features.
- Adjust the pressure, charge and discharge all the gas springs linked at the same time.

97. What are the advantages of using linked systems in relation to self-contained gas springs?
Gas springs linked systems enables the user to obtain the following advantages:

- Let control and modify the pressure of all the gas springs linked at the same time from outside the tool, there is no need to disassemble the tool nor control or modify the pressure of each gas spring separately.
- Let obtain a uniform force in all the areas where the gas springs linked are placed in the tool. In the event of a leak in one gas spring, the whole circuit is discharged in the same way, keeping always balanced the tool.
- Let use aditional monitoring systems such as warnings or safety stops in production when the parameters detected are not according to the predefined ones (pressure switch).

98. What are the disadvantages of using linked systems in relation to self-contained gas springs?
There are more potential leaking points in linked systems than in self-contained systems.

99. All the gas springs can be used into a linked systems?
NO, most of the gas springs can be used into a linked systems but some series of gas springs cannot be used into a linked systems.
At the begining of the catalog in the selection chart of gas springs, and also in the catalog sheet corresponding to each gas spring (right lower part) it may be checked if the gas sprigns can be used into a linked systems (it is indicated the model of control panel recommended), or on the contrary if cannot be used into a linked systems (it is indicated with a red cross).

100. May be linked gas springs with the filling port on the base?
In general it is not recommended to use into a linked systems the gas springs with filling port at the bottom (base should be always supported).

AZOL GAS

FREQUENTLY ASKED QUESTIONS

101. How to convert a self-contained gas spring into a linked gas spring?
The operating instructions steps detailed in the Manual for Servicing gas springs must be followed.
Gas spring must be discharged in advance and the filling valve removed.

102. Why gas springs to be used in linked systems are supplied unloaded?
In order to link gas springs it is necessary to drain the gas previously as long as the adapters, hoses and control panels must be fitted to the gas springs. In addition, the filling valves must be removed from the gas springs. That is why the gas springs for linked systes are supplied without being charged, to avoid discharging them after being received charged.

103. Why gas springs to be used in linked systems are supplied without filling valve?
The filling valved installed into the gas springs acts by means of pressure, when the pressure pushes the filling valve it opens and let the flow of gas, when there is no pressure pushing the filling valve it closes and do not allow the exit of the gas. As long as the linked systems connect all the gas springs each other through a circuit, it is necessary to remove the filling valve from the gas springs in order to let the constant N2 flow through the circuit.

104. What is the difference between a valve SKK 12R 1/8 and a valve SKK L?
Both valves have a thread one side 1/8" and the other side S12,65x1,5 and both are used in linked systems of 1/8", either for coupling gas springs, or to fit the corresponding adapters (CF), or the distribution blocks (PL), or control panels (600-CP).
While the filling valve of the gas spring acts by means of pressure, SKK 12R 1/8 valve acts by contact: only when the thread side S12,65x1,5 of the valve SKK 12R 1/8 is threaded to the hose end (GST-GPT-GRT) of a hose (SGS-RGS-PGS-RGR-PGP) the N2 flows.
The valve SKK 12R 1/8 is equipped with one-way device and only let the flow of gas in one direction, in such a way that when the valve SKK 12R 1/8 in not threaded to a hose end (GST-GPT-GRT) of a hose (SGS-RGS-PGS-RGR-PGP) the N2 flow is not permitted. This let the gas springs equipped with valve SKK 12R 1/8 the possibility of working as a self-contained or into a linked systems.
The valve SKK L is not equipped with one-way device and let the flow of gas in both directions, that is why the gas springs equipped with valves SKK L only can work into a linked systems not as self-contained.

105. What is the difference between an stardard reference (CW) and an –H reference (e.g.CW-H)?
The gas springs that can be used in hosed systems, it is possible to be ordered either as self-contained gas springs (if nothing specified), or as hosed gas springs (by adding –H to the standard reference).

- Self-contained gas springs are supplied fully charged to its pressure indicated in the catalogue.
- Hosed gas springs are supplied without gas charging and without charging valve.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

106. What is the difference between a gas spring AG and a gas spring AGB-H?
Gas springs AG have a unique filling port 1/8", and can be used either in self-contained or linked systems.
Gas springs AGB-H have 2 filling ports 1/8" located at 180º and these gas springs are only intended to be used for linked systems (supplied discharged and without filling valve).
The main advantages of AGB-H gas springs are: less space needed for piping, less number of piping parts, less number of potential leaking points.

107. What is the difference between a gas spring CW and a gas spring CWC?
Most of CW gas springs have a filling port M6 while CWC gas springs have a filling port 1/8".
The height of CWC gas springs is 10 mm longer than CW gas springs.

108. What is the difference between a gas spring CS and a gas spring CS-KC?
CS gas springs are designed to be used as self-contained gas springs (the filling port is located at the bottom), while CS-KC gas springs are designed to be used in linked systems but not into a self-contained systems.
The filling port of CS-KC is located on the body side.
The height of CS-KC is 20 mm longer than CS.

109. What is the difference between a gas spring CS-KC and a gas spring CS-KV?
CS-KC only can be used in hosed systems but not in self-contained systems (not equipped with filling valve).

CS-KV can be used both in self-contained and hosed systems (equipped with filling valve).

110. Why gas springs with M6 filling port only can use linked systems with M8x1?
Gas springs with filling port M6 on body side have their filling port axe at a height of 6 mm from the base of the gas spring, in such a way that only can be used adapters and hoses with diameter inferior to 12 mm (for instance adapters KRM6 – 90 BK V1– TE BK V1 and hose BK 200).
On the other hand, gas springs with filling port 1/8" on body side have their filling port axe at a height of 10,5 mm from the base of the gas spring, in such a way that can be used all the hose systems (1/8" – M8x1 – 7/16" – 9/16" – M12x1,5).

111. What are the control panels used for?
The control paneles are used to check and regulate the pressure (increase or dicrease the pressure) of a circuit on linked gas springs systems.

AZOL GAS

FREQUENTLY ASKED QUESTIONS

112. Several control panels may be used in the same installation?
Yes, indeed some of the stamping companies recommend to use several control panels when the gas springs to be linked exceed to a certain number/force (i.e. every 10 gas springs to use an independent circuit with its corresponding control panel).

113. Different gas springs can be hosed to the same circuit?
Yes although it is not usual (one of the targets and advantages of hosed systems is to keep a uniform force). All the gas springs connected to the same circuit will keep the same pressure, but not the same force:

- (i.e. in a hosed system with a control panel charged to 150 bar and mixed gas springs AG 750 050 and CW 1000 050 connected each other, all the gas springs will keep 150 bar pressure, but AG 750 050 will keep 740 daN of initial force and CW 1000 050 will keep 920 daN of initial force).
- (i.e. in a hosed system with a control panel charged to 150 bar and mixed gas springs AG 750 050 and AG 750 125 connected each other, all the gas springs will keep 150 bar pressure, and also all of them will keep the same initial force, but AG 750 050 will keep 1098 daN of final force and AG 750 125 will keep 1160 daN of final force).

114. What is a rupture disk?
It is a safety device indicated as an option on the control panels.
It consists of an special screw on the control panel that allows the gas draining of the linked system in the event of the gas pressure is over a predefined value (i.e. 360 bar / 5220 psi or 517 bar / 7500 psi).

115. What are the Distribution Blocks used for?
The Distribution Blocks are used into the linked systems to connect through hoses several gas springs to a 1 Distribution Block and then from the Distribution Block only 1 hose to the Control Panel.
The main aim is to make easier the piping tasks when fitting the gas springs to the adapters and hoses, what allows an easier distribution of the hoses into the tool where are fixed.

116. Hoses and end hoses adapters may be fitted manually?
NO, hose ends (GST-GPT-GRT-BKRT-TFRT-TFLT-MCRT-MCLT-GTRT-GTLT-TNRT-TNLT-TNCT) and hoses (GF 02 – GF 05) only can be assembled with the adequate Clamping machines and following the operating instructions from the Manual for Servicing gas springs.

117. What are the hose clips RBP 5 & RPB 10 used for?
Hose clips are used to fix the hoses into the tool, in order to avoid non desired movements of the hoses on the tool.

118. What are the Die Information Tags used for?
Die Information Tags are used to notify the user about the tool is equipped with gas springs at a high pressure, so as to keep in mind and meet the opportune operating instructions when manipulating gas springs.

FREQUENTLY ASKED QUESTIONS

AZOL GAS

119. What are the Compensation Tanks used for?

The Compensation Tanks are used to increase the gas volumen in hosed systems in order to reduce the gas compression rate. The initial pressure may be the same but the final pressure is lower if using Compensation Tanks. In this way, a more stable performance is achieved, with less force variation.

120. How to calculate the Compensation Tanks?

The final pressure of a self-contained gas springs it might be calculated in the following way: Pfinal = Pinitial x (Vinitial / Vfinal), where P is pressure and V is volume.

The final volume might be calculated as the initial volumen minus the volume of piston rod that it is inserted into the gas volume.

For example: if the initial volume is 100, and the volume of the piston rod inserted into the gas volume is 50, then the final volume would be 100 - 50 = 50.

The final pressure would be: Pinitial x (100 / 50) = 2 x Pinitial (and also the force).

But if using a Compensation Tank of a volume 100: the initial volume would be 200, and the final volume would be 200 - 50 = 150. The final pressure would be: Pinitial x (200 / 150) = 1,33 x Pinitial (and also the force).

The higher the initial volume, the relation between Vinitial / Vfinal will be closer to 1 (always superior), and then the pressure increase by the stroke used with be lower.

AZOL GAS

AZOL GAS

Landalucía, 7, P.I. Júndiz
01015 Vitoria-Gasteiz
Tel.: +34 945 290 010
Fax: +34 945 290 381

azolgas@azolgas.com
www.azolgas.com

Edition 09/2022