High quality gas spring manufacturer!
Ningbo Gastac Gas Spring Co.,Ltd

- Add： No.818, Liyuan North Road, Haishu, Ningbo,China Zip: 315010
- E-mail: sales@gastac.com http://www.gastac.com
- Tel: 13626842823 0574-87454979 Fax:0574-87008307

Gastac Gas Spring

Standard Gas Spring | Pulling Gas Spring | Locking Gas Spring | Hydraulic Damper | Special Gas Spring

Gastac Gas Spring

Ningbo GasTac Gas Spring Co.,Ltd is established in 2006, which specialized in manufacturing gas springs, locking gas spring and hydraulic dampers, with more than 10 years' experience in exporting. Main markets including: Europe, America, Southeast Asia, South Korea, Australia, Russia, South Africa and so on.

Company Mission

Gastac is dedicated to providing security and high performance products with all types of gas spring, locking gas spring, hydraulic damper.

Main Products and Application:

Gastac gas springs can applied to automobile, furniture, hospital bed, operating tables, massage tables, over bed tables, ship building, tractor cab, coaches, seat, forklifts, machine, Medical and Rehabilitation Technology.

Quality Goal

Process defect rate≤3‰

Delivery inspection rate100%

On time delivery rate100%

Customer complaint rate≤1%

Customer satisfaction rate≥99%

Menu

First、Gastac Company Profile and Qualification Certificate

1.Gastac Company Profile

Ningbo Gastac Gas Spring Co., Ltd was established in December 2006,is a professional gas spring enterprise integrating design and R&D, manufacturing, sales and service. There are 26 employees now, with more than 15 years of professional experience in gas spring product design and manufacturing industry, and rich experience in gas spring design, production and verification.Besides,our chief engineer is the Technical Director of China National Gas Spring Technology Standards.

Company Mission

Gastac is dedicated to providing security and high performance products with all types of gas spring, locking gas spring, hydraulic damper.

Gastac company and gas spring products have successively passed ISO / TS16949: 2009, IS09001: 2008 international quality system certification and SGS, TUV and other third-party testing and testing institutions to conduct strict tests.

1.2 .1Gastac Certificate—ISO /IATF16949

Certificate of Registration

Intertek

This is to certify that the quality management system of

Ningbo Gastac Gas Sping Co.,Ltd.

Dinghai Road 66# , Ningbo City, Zhejiang Province, China 315200

has been assessed and registered by Intertek as conforming to the requirements of

ISO 9001: 2008

The quality management system is applicable to:

Manufacture of gas spring.

Certificate Number: 111310010
Certificate Issue Date: 09 January 2017
Certificate Expiry Date: 08 January 2020

UKAS MANAGEMENT SYSTEMS 014

Authorised Signature: Calin Moldovean – President, Business Assurance
Intertek Certification Limited, 10A Victory Park, Victory Road, Derby DE24 8ZF, United Kingdom

Intertek Certification Limited is a UKAS accredited body under schedule of accreditation no. 014.

In the issuance of this certificate, Intertek assumes no liability to any party other than to the client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone.
The annual validity of the certificate can also be checked through the website http://www.cnca.gov.cn of CNCA in China.

The certificate remains the property of Intertek, to whom it must be returned upon request.

Intertek Intertek Intertek Intertek

Certificate of Registration

Intertek

This is to certify that the quality management system of

Ningbo Gastac Gas Sping Co.,Ltd.

Dinghai Road 66#, Ningbo City, Zhejiang Province, China 315200

has been assessed and registered by Intertek as conforming to the requirements of

ISO/TS 16949:2009

The quality management system is applicable to

Manufacture of Gas Spring.

Having been audited in accordance with the "Rules for achieving IATF recognition 3rd Edition for ISO/TS 16949:2009"
Permissible exclusions include: Product Design

IATF Certificate Number: 0177537
Certificate Number: 2008-0006
Initial Certification Date: 05 February 2008
Certificate Issue Date: 09 January 2017
Certificate Expiry Date: 08 January 2020

Calin Moldovean, President
Intertek – 4700 Broadmoor, Suite 200, Kentwood MI 49512, USA

In the issuance of this certificate, Intertek assumes no liability to any party other than to the Client, and then only in accordance with the agreed upon Certification Agreement. This certificate's validity is subject to the organization maintaining their system in accordance with Intertek's requirements for systems certification. Validity may be confirmed via email at certificate.validation@intertek.com or by scanning the code to the right with a smartphone.

The certificate remains the property of Intertek, to whom it must be returned upon request. CT-ISO/TS 16949:2009-eng-04.jan.12

Page 1 of 2

Intertek Intertek Intertek Intertek

1.2.2 Gastac Certificate—TUV /SGS

Choose certainty.
Add value.

Technical Report No. 70.404.15.1485.01-00
Rev. 01
Dated 2016-01-22

Client:	Ningbo Gastac Gas Spring Co., Ltd. Dinghai Road 66# , Ningbo City, Zhejiang Province, China
Manufacturing place:	Same as above
Test subject:	Product: Gas spring Type: S-185471-520-1022-S4S1 The detail parameters, please refer to the technical data
Test specification:	GB 25751-2010 Clause 7.5.1 (modified) Client's requirement
Purpose of examination:	• Test according to the test specification • Test according to the client's requirement
Test result:	The test results show that the presented product is in compliance with the specified requirements.

TPS_GCN_F_09.20E – Rev. 1 2012-10-29

This technical report may only be quoted in full. Any use for advertising purposes must be granted in writing. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production.

Telephone : +86-21-6141 0123
Telefax : +86-21-6140 8600
http://www.tuv-sud.cn

TUV SUD Certification and Testing (China) Co., Ltd.
Shanghai Branch
TÜV SÜD Group
3-13, No.151 Heng Tong Road
Shanghai 200070
P.R. China

1 Description of the test subject

1.1 Technical Data

Model:	S-185471-520-1022-S4S1
Weight:(g)	365
Length:(mm)	315~495
Diameter of piston rod:(mm)	10.0
Diameter of cylinder: (mm)	22.6

2 Order

2.1 Date of Purchase Order, Customer's Reference

2015-12-22, Mrs. Chen

2.2 Receipt of Test Sample, Location

2015-12-22, TÜV SÜD Shanghai, 5pcs

2.3 Date of Testing

From 2015-12-22 to 2016-01-18

2.4 Location of Testing

No. 1999 Duhui Road, 201108, Shanghai, P. R. China

TPS_GCN_F_09.20E – Rev. 1 2012-10-29

Telephone : +86-21-6141 0123
Telefax : +86-21-6140 8600
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Shanghai Branch
TÜV SÜD Group
3-13, No.151 Heng Tong Road
Shanghai 200070
P.R. China

3 Test Results

Clause	Requirement Test	Measuring Result Remark	Verdict
1	**Durability test in room temperature** **GB 25751-2010 Clause 7.5.1 (modified)** Test requirement Frequency: 4~6 cycles/min Range: 180mm Cycle: 200 000 After the test, the decrement of the compressing force, F_a, shall be less than 8%. During the test, the temperature of the gas spring shall be less than 50℃.	The sample kept its function after test. F_a (Initial status) = 813N F_a (After the test) = 828N The decrement of the compressing force was less than 8% after test.	P

4 Remark

The sample has been examined according to the client's requirements.
The difference between GB 25751-2010, 7.5.1 and client's requirement:
1) No requirement for the oil leak;
2) Durability requirement is 200000 cycles instead of 25000 cycles.

5 Product Photo

6 Summary

The test specification is met.

Hardlines - MES
TÜV SÜD Certification and Testing (China) Co., Ltd.
Shanghai Branch

Engineer: Mike Cai
Mike Cai
Project Handler

Technical Report checked: Peter Ye
Peter Ye
Designated Reviewer

Telephone : +86-21-6141 0123
Telefax : +86-21-6140 8600
http://www.tuv-sud.cn

TUV SUD Certification and Testing (China) Co., Ltd.
Shanghai Branch
TÜV SÜD Group
3-13, No.151 Heng Tong Road
Shanghai 200070
P.R. China

1.2.2 Gastac Certificate—TUV /SGS

Gastac GAS SPRING ®

Test Report No. SHAAUTO1516377702 Date: 07 Jan 2016 Page 1 of 10

Ningbo Gastac Gas Spring Co., Ltd
Dinghai Road 66#, Ningbo City, Zhejiang Province, China

Sample Name :	gas spring
SGS Job No. :	SHAT1508025467IN - SH
Manufacturer :	Ningbo Gastac Gas Spring Co., Ltd
Date of Sample Received :	14 Aug 2015
Testing Period :	14 Aug 2015 - 24 Aug 2015
Test Requested :	As specified by applicant, determination of Cadmium, Lead, Mercury, Hexavalent Chromium in automotive materials, and determination of PBBs/ PBDEs in nonmetallic material, with reference to QC/T 943-2013, QC/T 941-2013, QC/T 942-2013, QC/T 944-2013.
Test Method :	Please refer to next page(s).
Test Results :	Please refer to next page(s).
Conclusion :	Based on the performed tests on submitted samples as specified by applicant, the test results of Cadmium, Lead, Mercury, Hexavalent Chromium in automotive materials and PBBs/ PBDEs in nonmetallic material, comply with GB/T 30512-2014.
Note :	The test results are related only to the tested items. The report shall not be reproduced except in full without the written approval of the testing laboratory.

Signed for and on behalf of
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

Terry Wang
Approved Signatory

Test Report No. SHAAUTO1516377702 Date: 07 Jan 2016 Page 2 of 10

Test Method : Tests was performed for the samples indicated by the photos in this report with reference to QC/T 943-2013, QC/T 941-2013, QC/T 942-2013, QC/T 944-2013.
(1) Screening by EDXRF Spectroscopy.
(2) Wet Chemical Test Method:
a. Determination of Lead & Cadmium by ICP-OES.
b. Determination of Mercury by ICP-OES.
c. Determination of Hexavalent Chromium by spot test / Colorimetric Method using UV-Vis.
d. Determination of PBBs and PBDEs by GC-MS.

Test Report No. SHAAUTO1516377702 Date: 07 Jan 2016 Page 3 of 10

Part No.	Part Description	BOM No.	Restricted Substances	Results of EDXRF (1)	Result of Wet Chemical Testing(2) (mg/kg)	Conclusion on GB/T 30512-2014	Sample Submitted / Resubmitted Date
1	Black coating		Pb	P	---	Comply	14 Aug 2015
			Cd	P	---	Comply	
			Hg	P	---	Comply	
			Cr(VI)	P	---	Comply	
			PBBs	P	---	Comply	
			PBDEs	P	---	Comply	
2	Silvery metal (Substrate)		Pb	P	---	Comply	14 Aug 2015
			Cd	P	---	Comply	
			Hg	P	---	Comply	
			Cr(VI)	X	Negative	Comply	
			PBBs	---	---	---	
			PBDEs	---	---	---	
3	Black metal piston		Pb	P	---	Comply	14 Aug 2015
			Cd	P	---	Comply	
			Hg	P	---	Comply	
			Cr(VI)	P	---	Comply	
			PBBs	---	---	---	
			PBDEs	---	---	---	
4	Black coating		Pb	P	---	Comply	14 Aug 2015
			Cd	P	---	Comply	
			Hg	P	---	Comply	
			Cr(VI)	P	---	Comply	
			PBBs	P	---	Comply	
			PBDEs	P	---	Comply	

Test Report No. SHAAUTO1516377702 Date: 07 Jan 2016 Page 4 of 10

Part No.	Part Description	BOM No.	Restricted Substances	Results of EDXRF (1)	Result of Wet Chemical Testing(2) (mg/kg)	Conclusion on GB/T 30512-2014	Sample Submitted / Resubmitted Date
5	Silvery metal (Substrate)		Pb	P	---	Comply	14 Aug 2015
			Cd	P	---	Comply	
			Hg	P	---	Comply	
			Cr(VI)	P	---	Comply	
			PBBs	---	---	---	
			PBDEs	---	---	---	
6	Silvery metal (Substrate)		Pb	P	---	Comply	14 Aug 2015
			Cd	P	---	Comply	
			Hg	P	---	Comply	
			Cr(VI)	P	---	Comply	
			PBBs	---	---	---	
			PBDEs	---	---	---	
7	Black metal		Pb	P	---	Comply	14 Aug 2015
			Cd	P	---	Comply	
			Hg	P	---	Comply	
			Cr(VI)	P	---	Comply	
			PBBs	---	---	---	
			PBDEs	---	---	---	
8	Black metal gasket		Pb	P	---	Comply	14 Aug 2015
			Cd	P	---	Comply	
			Hg	P	---	Comply	
			Cr(VI)	X	Negative	Comply	
			PBBs	---	---	---	
			PBDEs	---	---	---	

Test Report No. SHAAUTO1516377702 Date: 07 Jan 2016 Page 5 of 10

Part No.	Part Description	BOM No.	Restricted Substances	Results of EDXRF (1)	Result of Wet Chemical Testing(2) (mg/kg)	Conclusion on GB/T 30512-2014	Sample Submitted / Resubmitted Date
9	Black plastic		Pb	P	---	Comply	14 Aug 2015
			Cd	P	---	Comply	
			Hg	P	---	Comply	
			Cr(VI)	P	---	Comply	
			PBBs	X	ND	Comply	
			PBDEs	X	ND	Comply	
10	Black metal		Pb	P	---	Comply	14 Aug 2015
			Cd	P	---	Comply	
			Hg	P	---	Comply	
			Cr(VI)	X	Negative	Comply	
			PBBs	---	---	---	
			PBDEs	---	---	---	

Test Report No. SHAAUTO1516377702 Date: 07 Jan 2016 Page 6 of 10

Remark

(1) (a) There are the results on total Br while test items on restricted substances are PBBs and PBDEs. There is the result on total Cr while test item on restricted substances is Cr(VI).

(b) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP-OES (for Cd, Pb, Hg) UV-Vis (for Cr(VI)), GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceds the below warning value according to QC/T 943-2013, QC/T 941-2013, QC/T 942-2013, QC/T 944-2013. (unit: mg/kg).

Element	Polymer	Metal	Others
Cd	P ≤(70-3S)< X <(130+3S)≤ F	P ≤(70-3S)< X <(130+3S)≤ F	LOD < X <(150+3S)≤ F
Pb	P ≤(700-3S)< X<(1300+3S)≤ F	P ≤(700-3S)< X <(1300+3S)≤ F	P ≤(500-3S)< X <(1500+3S)≤ F
Hg	P ≤(700-3S)< X <(1300+3S)≤ F	P ≤(700-3S)< X <(1300+3S)≤ F	P ≤(500-3S)< X <(1500+3S)≤ F

Element	Polymer	Others
Cr	P ≤ (700-3S)< X	P ≤ (500-3S)< X

Element	Polymer	Electronic element
Br	P ≤ (300-3S)< X	P ≤ (250-3S)< X

(c) P = Pass, F = Fail, X = Inconclusive, LOD = Limit of Detection.

(2) (a) mg/kg = 0.0001%, MDL=Method detection limit, ND = Not detected (<MDL), --- = Not conducted.

(b) Unit and MDL in wet chemical test

Test Item	Pb	Cd	Hg
Unit	mg/kg	mg/kg	mg/kg
MDL	2	2	2

The MDL for single compound of PBBs and PBDEs is 5 mg/kg;
MDL of Cr(VI) for Polymer and Electronic element sample is 2 mg/kg;
MDL of Cr(VI) for Leather sample is 3 mg/kg;
MDL of Cr(VI) for metal plating sample is 0.02μg/cm².
MDL of Cd, Pb, Hg for metal plating sample is 10 mg/kg.

Test Report No. SHAAUTO1516377702 Date: 07 Jan 2016 Page 7 of 10

(c) Spot-test:
Negative = Absence of Cr(VI) coating;
(The tested sample should be further verified by boiling-water-extraction method if the spot test result cannot be confirmed.)
Boiling-water-extraction:
Negative = Absence of Cr(VI) coating;

Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.

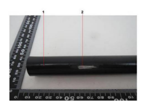
(3) --- = Not provided by applicant.

Test Report No. SHAAUTO1516377702 Date: 07 Jan 2016 Page 8 of 10

Sample photo:

SHAAUTO1516377702

SHAAUTO1516377702



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SHAAUTO1516377702

SHAAUTO1516377702

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SHAAUTO1516377702

SHAAUTO1516377702

SGS authenticate the photo on original report only

*** End of Report ***

Second、Gastac Gas Spring Specifications

2.Gastac Gas Spring Specifications

Ningbo Gastac Gas Spring Co. Ltd

Standard Gas Spring

Bidirectional same speed gas spring
Variable damping gas spring
Compressed damping gas spring
Balance (Random stop) gas spring

Pulling Gas Spring

Extension undamped pulling gas spring
Extension damped pulling gas spring
Extension locked Pulling gas spring
Extension auto-locked Pulling gas spring

Locking Gas Spring

Elastic locking gas spring
Extension rigid locking gas spring
Compression rigid locking gas spring

Hydraulic Damper

Bidirectional hydraulic damper
Compressed hydraulic damper
extension hydraulic damper

Special Gas spring

Stainless steel gas spring
Gas spring with protective sleeve
Gas Spring with auto-locking
Temperature controlled gas spring
Mini Gas Spring
High Speed Gas Spring

2.1 Standard Gas Spring

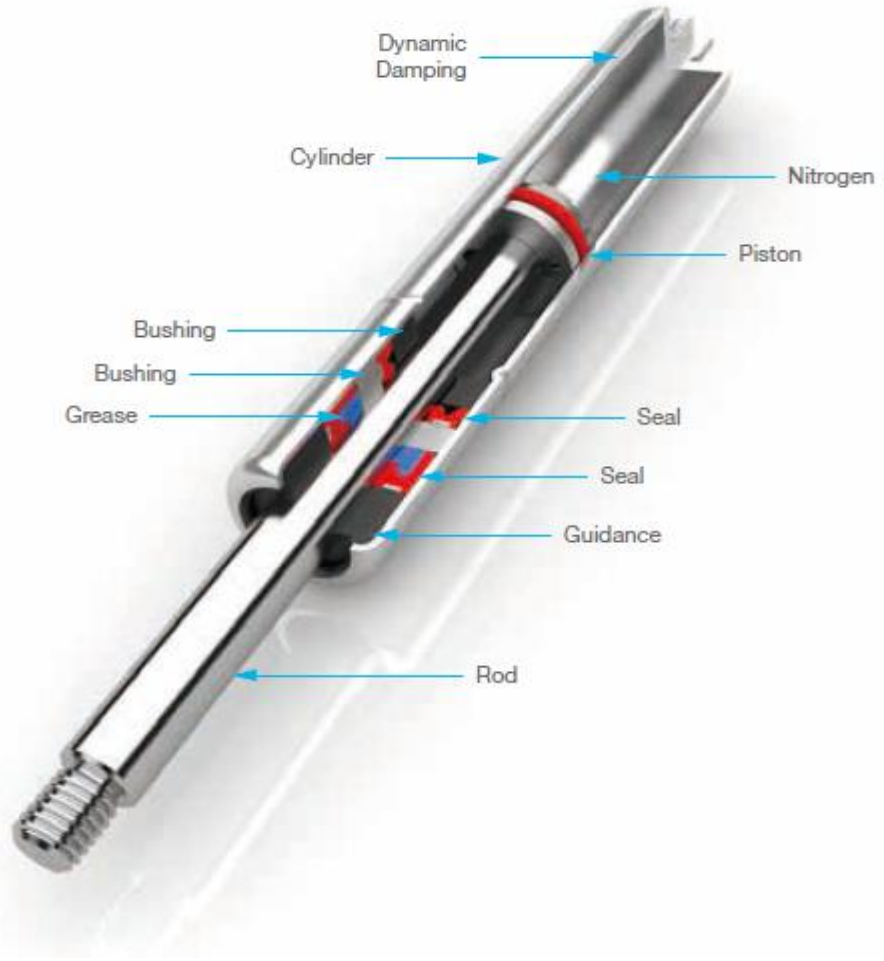
Gastac will serve the successful experience of quality management of auto OEMs to serve customers in more different industries, including construction machinery, medical equipment, aviation manufacturing, mechanical processing, fitness equipment and furniture industries.

Gastac provides reliable products and solutions to make customers' final products work more efficiently.

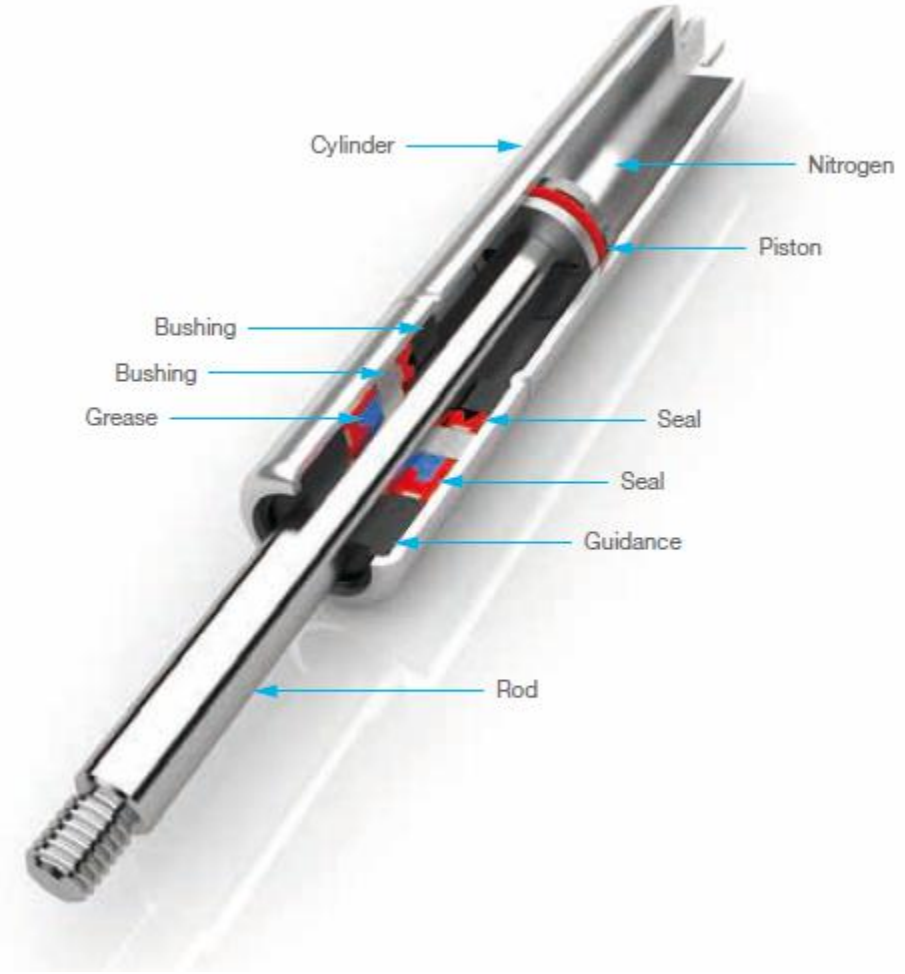
Gastac damper has a flow limiting slot with variable damping, which makes it easier for customers to achieve the best damping effect. At the same time, this damper has a very good performance in service life.

2.1.1 Standard Gas Spring-Compression Gss Spring

2.1.2 Standard Gas Spring-Variable Damper



2.1.3 Standard Gas Spring-Bidirectional Same Speed



2.1.4 Standard Gas Spring-Stainless Gas Spring

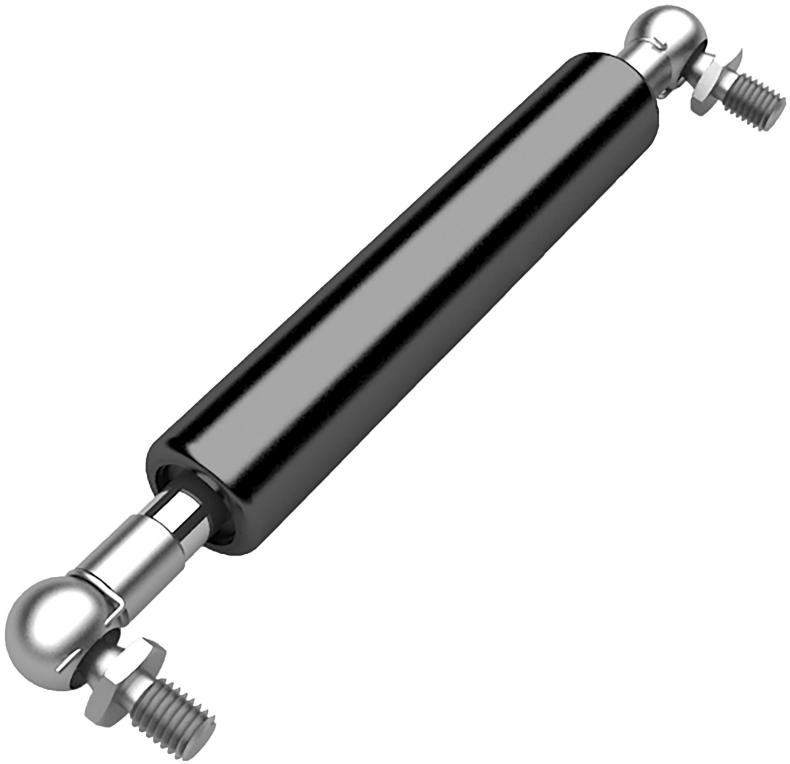
2.2 Pulling Gas Spring

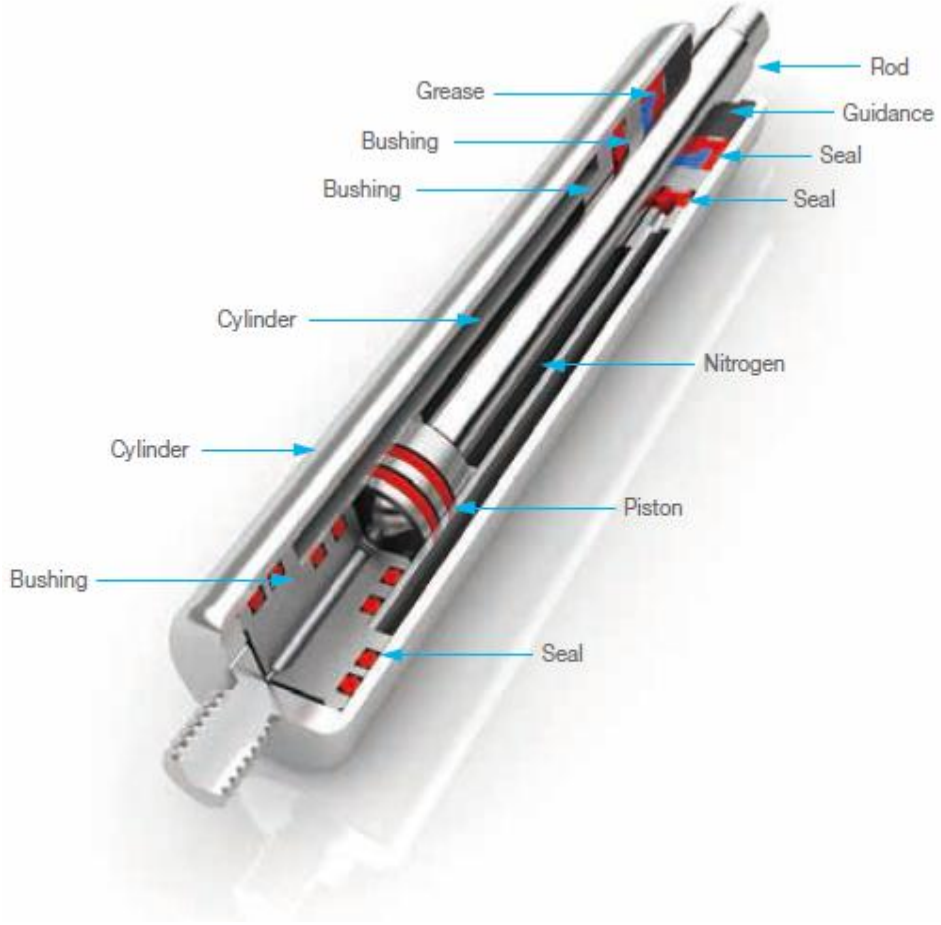
Gastac will serve the successful experience of quality management of auto OEMs to serve customers in more different industries, including construction machinery, medical equipment, aviation manufacturing, mechanical processing, fitness equipment and furniture industries.

Gastac provides reliable products and solutions to make customers' final products work more efficiently.

Gastac damper has a flow limiting slot with variable damping, which makes it easier for customers to achieve the best damping effect. At the same time, this damper has a very good performance in service life.

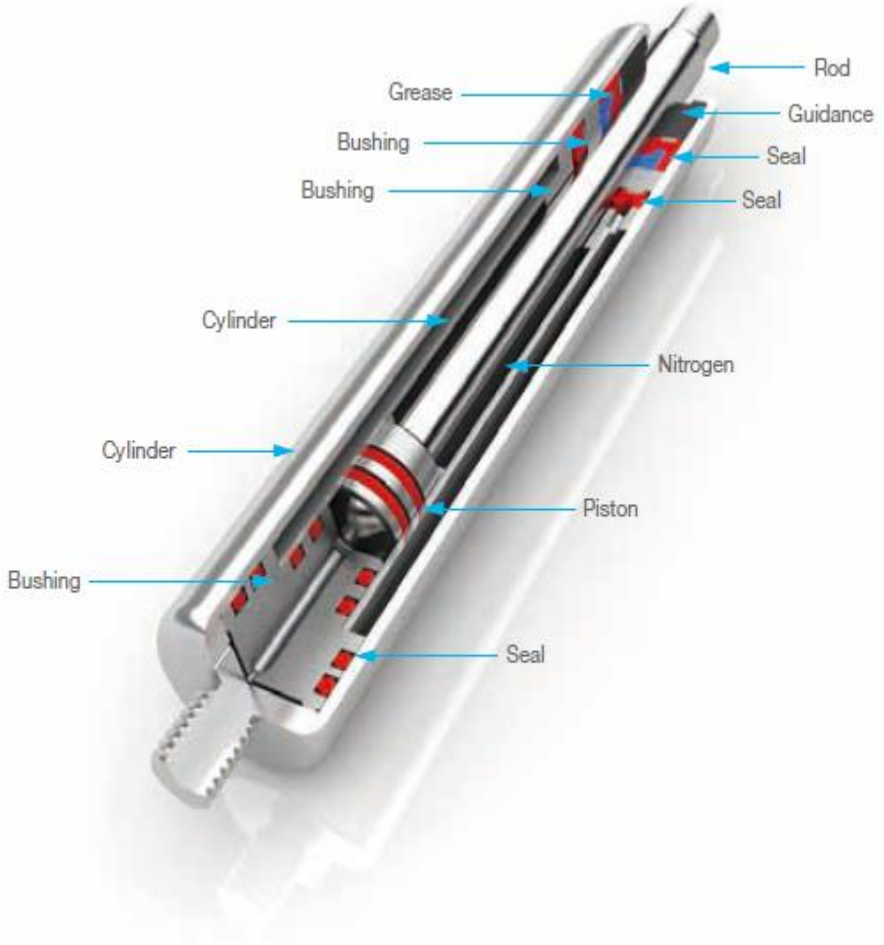
2.2.1 Pulling Gas Spring-Standard



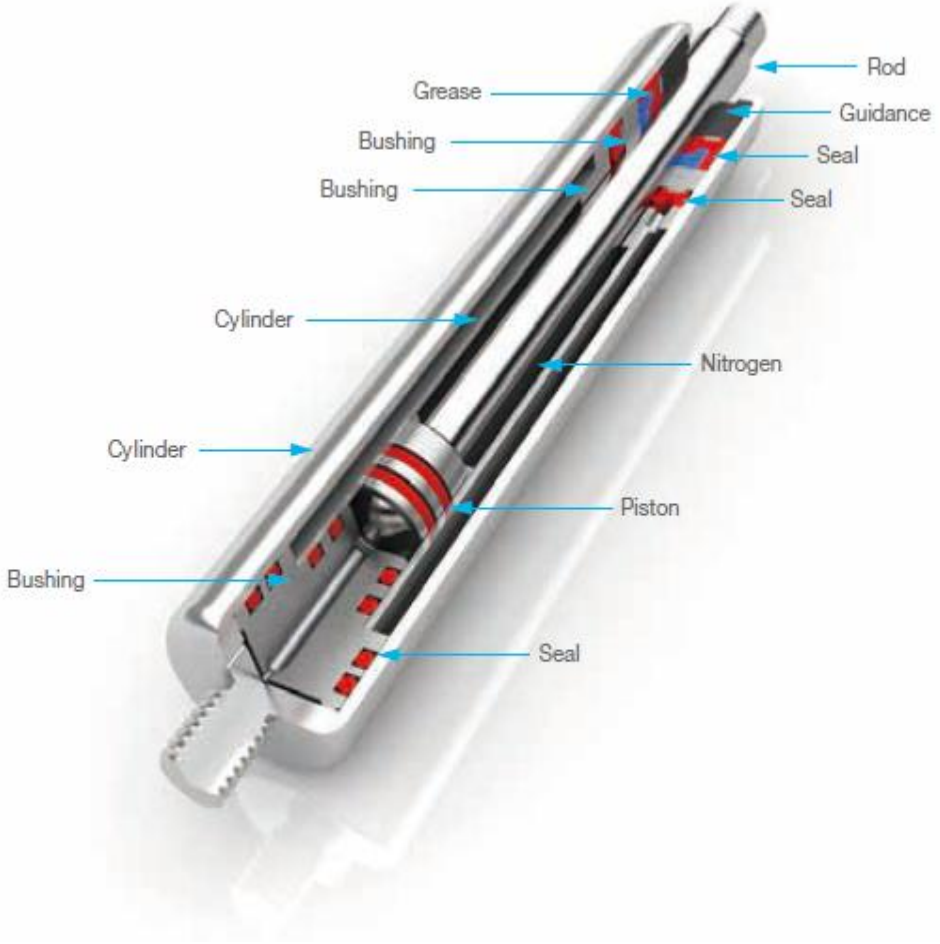


2.2.2 Pulling Gas Spring-Both rods

2.2.3 Pulling Gas Spring-Both Tube



2.2.4 Pulling Gas Spring-Stainless Steel



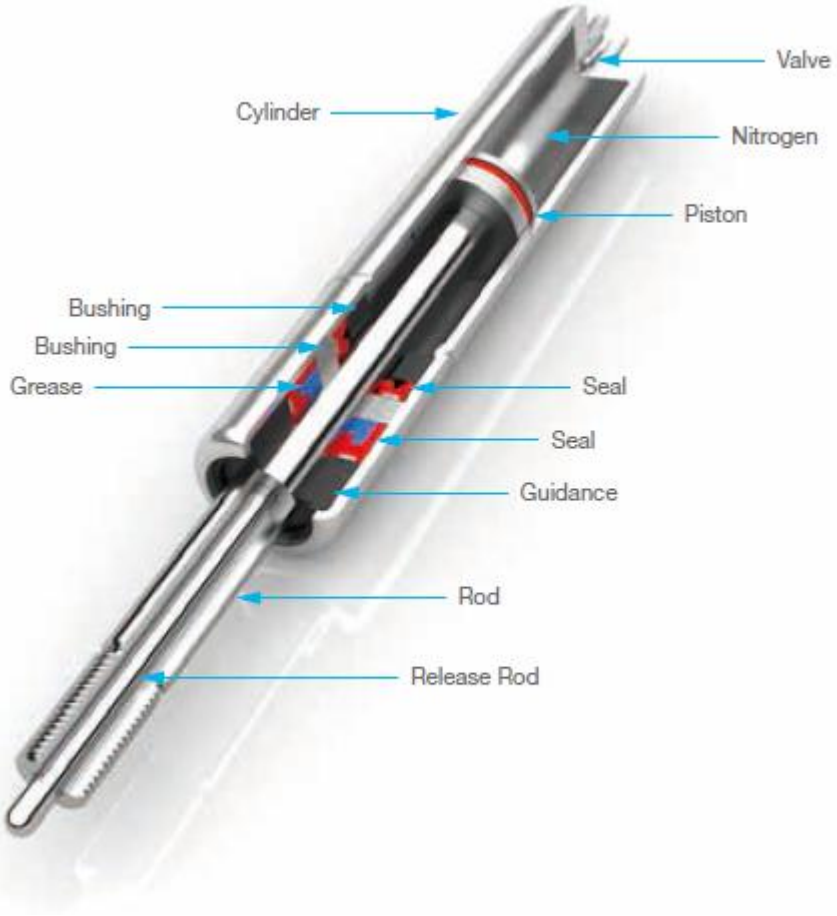
2.3 Locking Gas Spring

Gastac will serve the successful experience of quality management of auto OEMs to serve customers in more different industries, including construction machinery, medical equipment, aviation manufacturing, mechanical processing, fitness equipment and furniture industries.

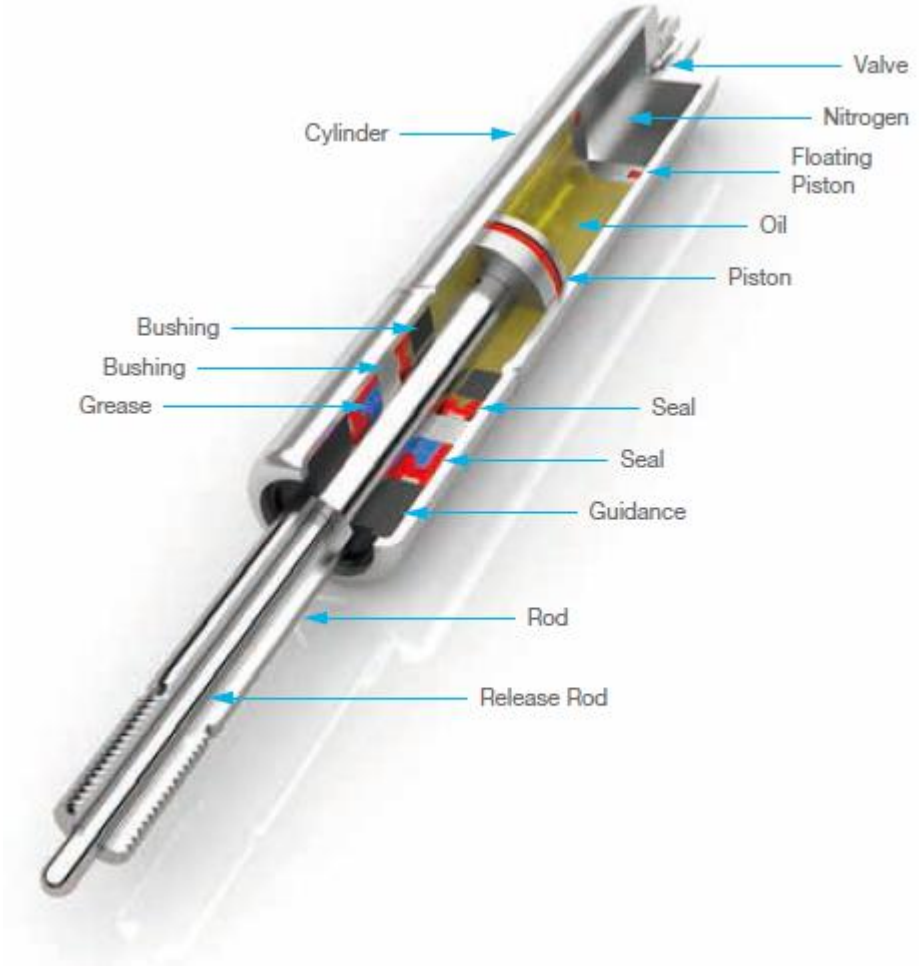
Gastac provides reliable products and solutions to make customers' final products work more efficiently.

Gastac damper has a flow limiting slot with variable damping, which makes it easier for customers to achieve the best damping effect. At the same time, this damper has a very good performance in service life.

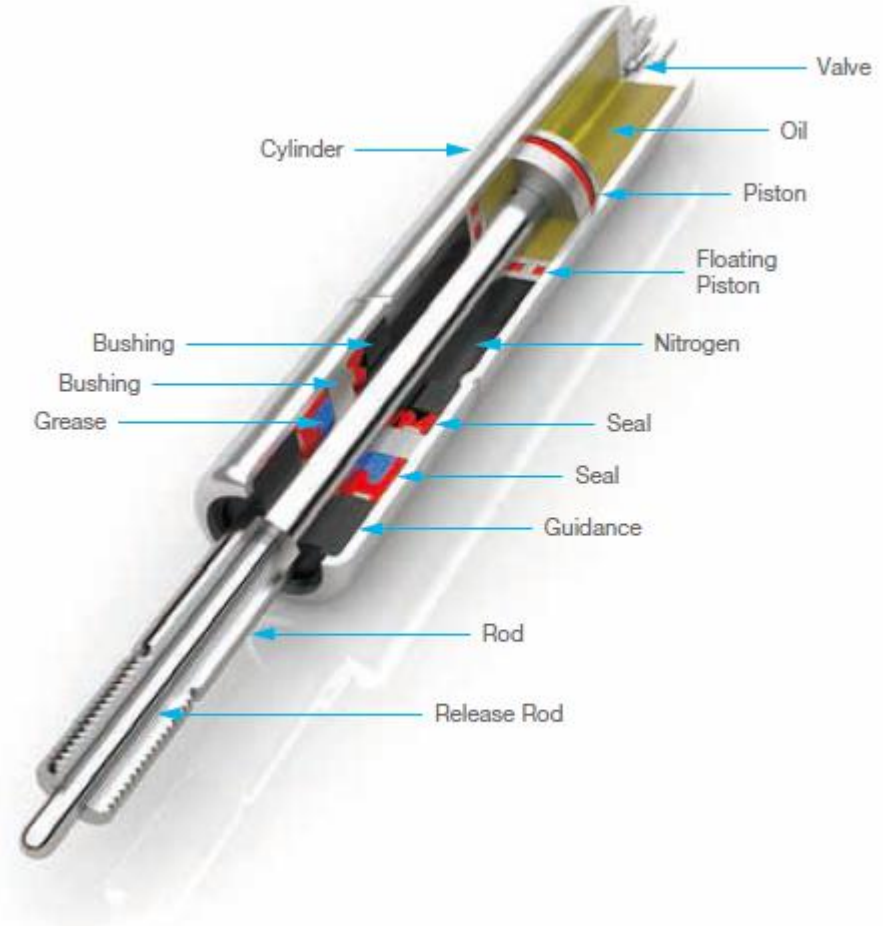
2.3.1 Locking Gas Spring-Elastic Type



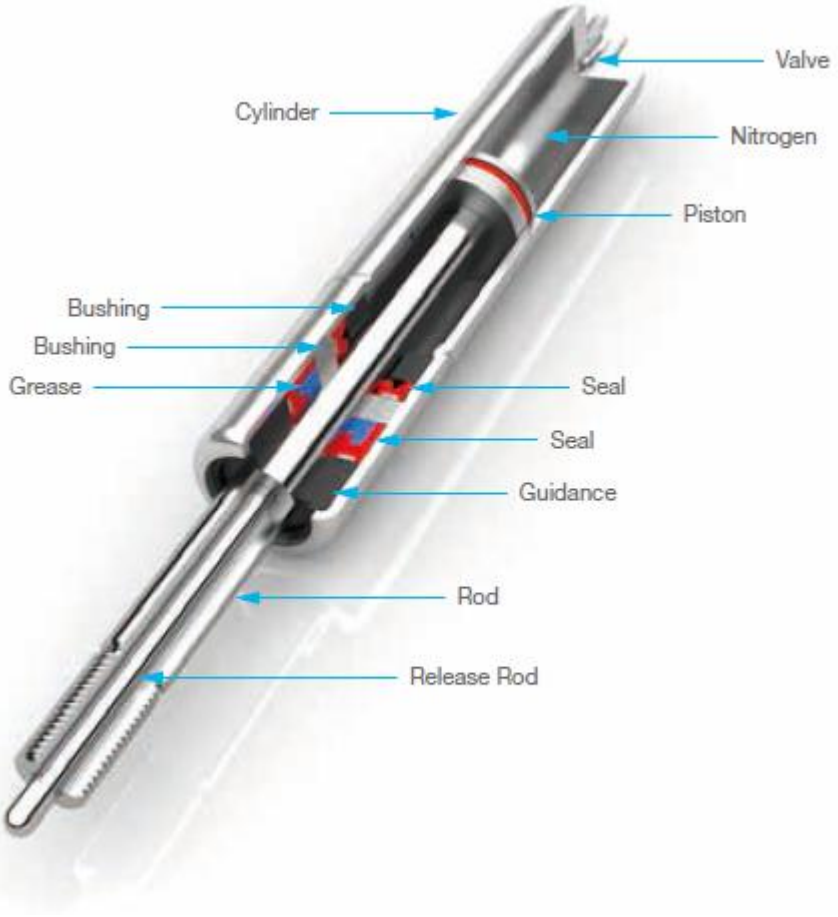
2.3.2 Locking Gas Spring-Extension Rigid



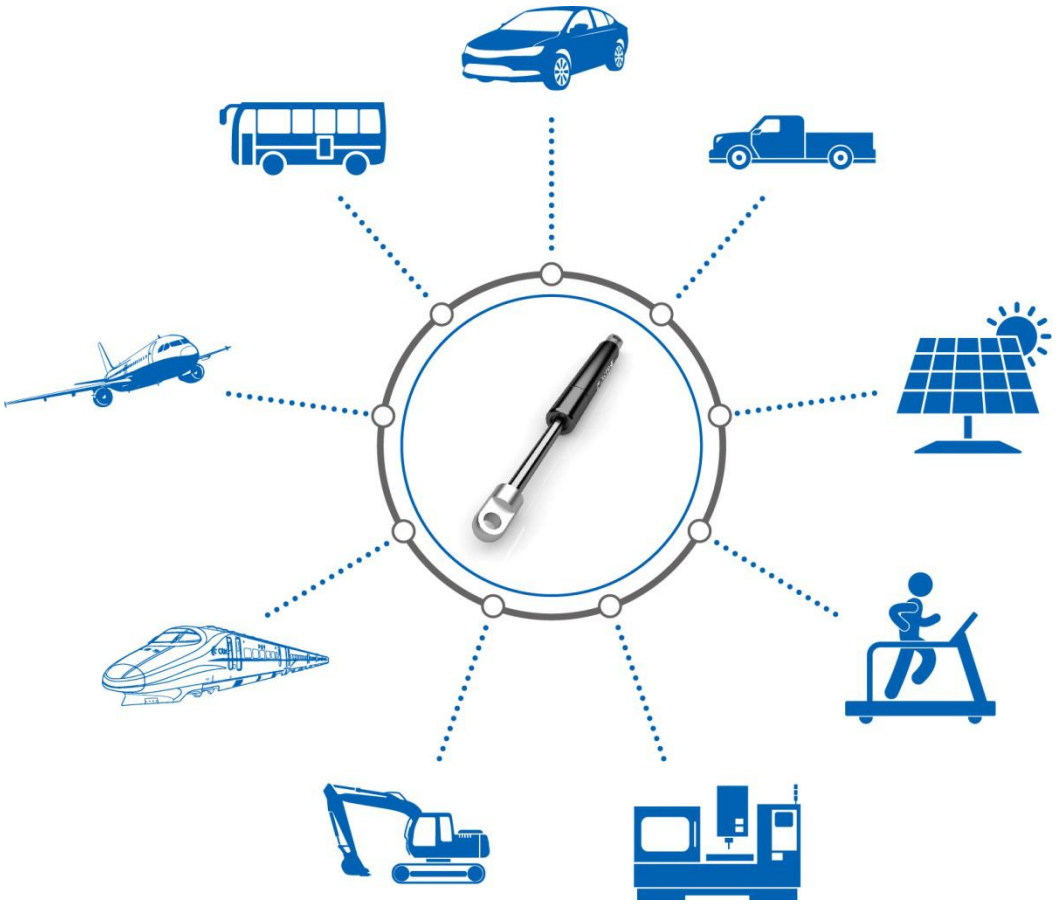
2.3.3 Locking Gas Spring-Compression Rigid



2.3.4 Locking Gas Spring-Stainless Steel



2.4 Hydraulic Damper

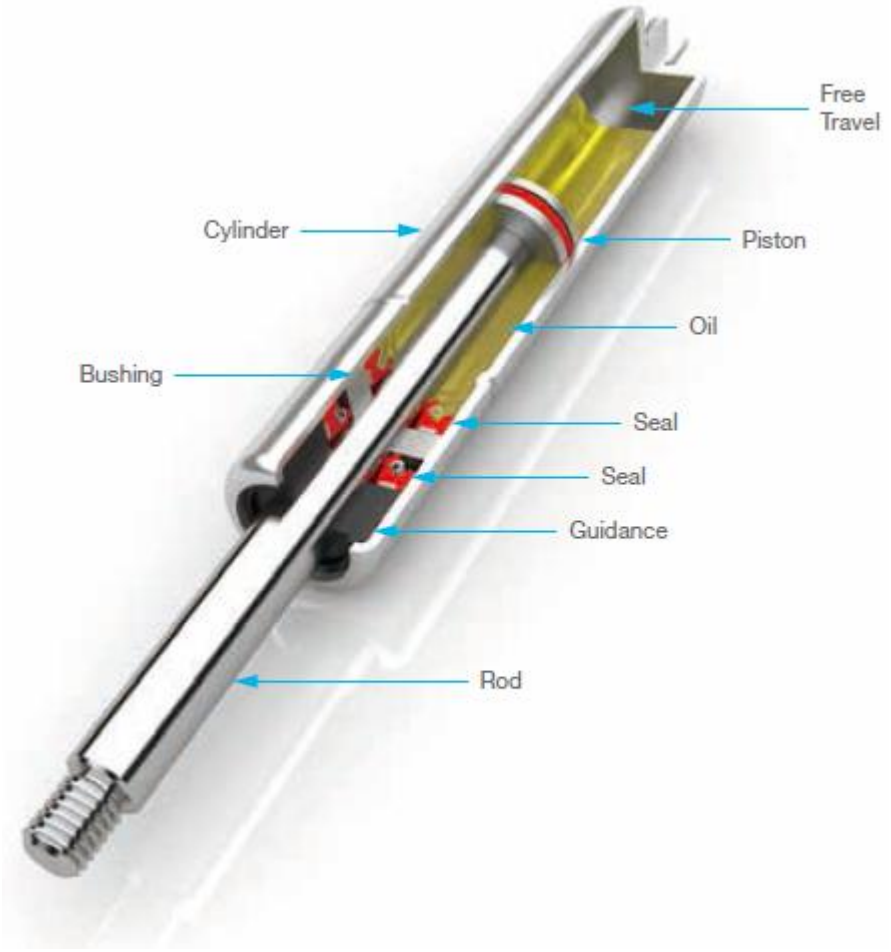


Gastac will serve the successful experience of quality management of auto OEMs to serve customers in more different industries, including construction machinery, medical equipment, aviation manufacturing, mechanical processing, fitness equipment and furniture industries.

Gastac provides reliable products and solutions to make customers' final products work more efficiently.

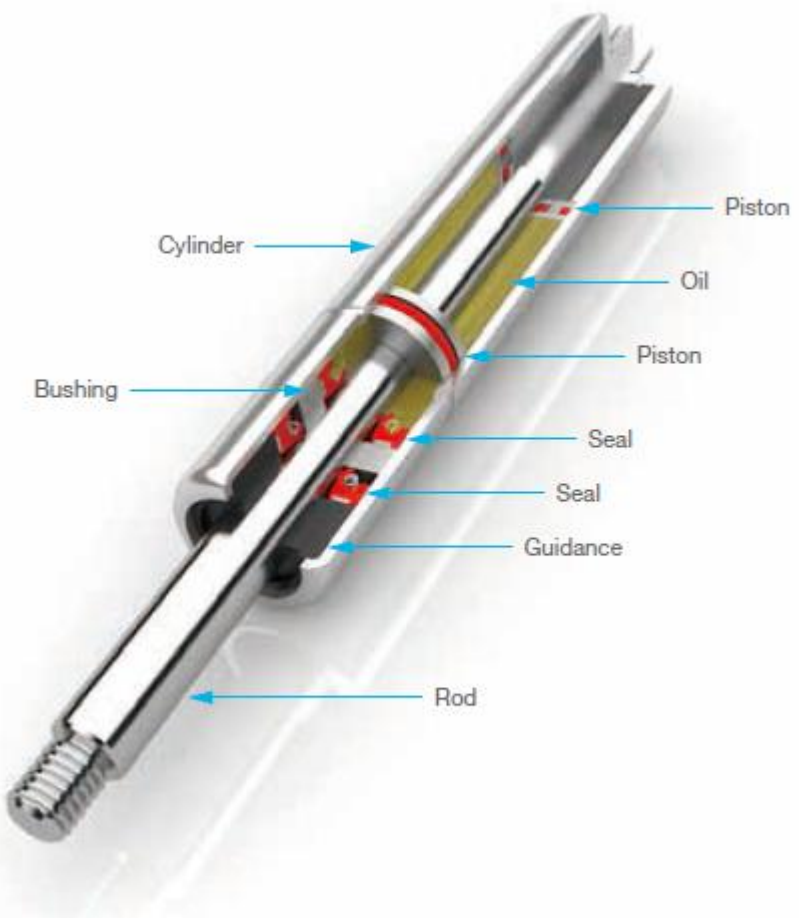
Gastac damper has a flow limiting slot with variable damping, which makes it easier for customers to achieve the best damping effect. At the same time, this damper has a very good performance in service life.

2.4 .1 Hydraulic Damper-Standard

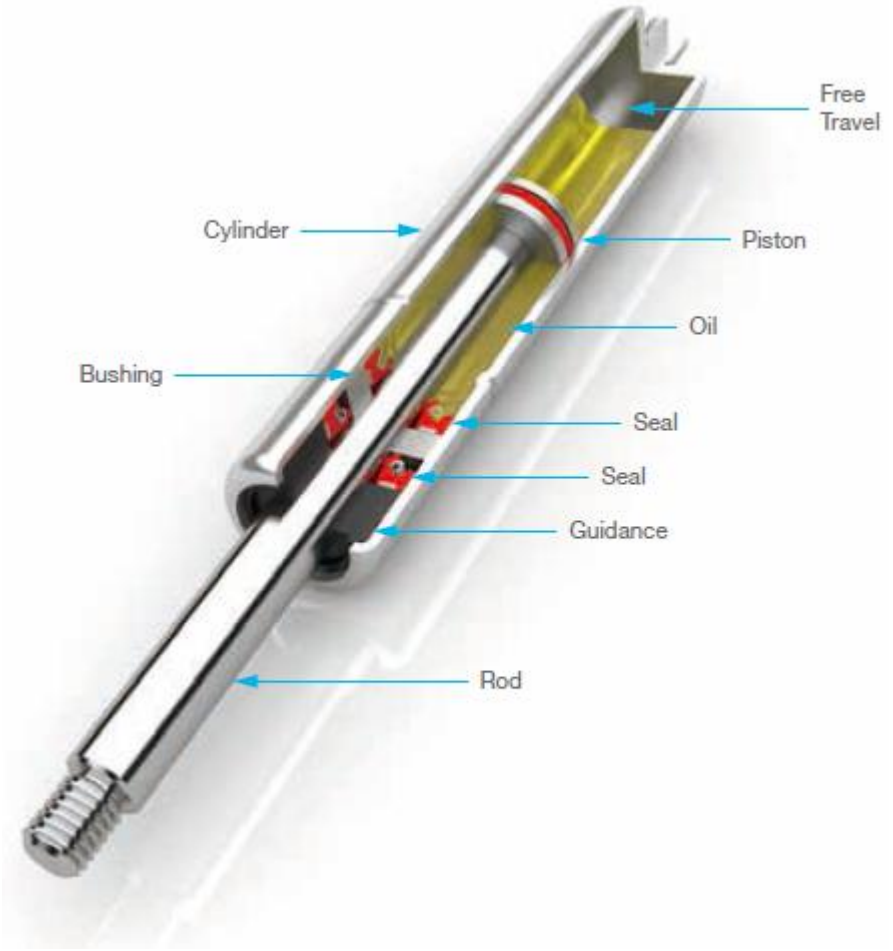


2.4 .2 Hydraulic Damper-With Floating piston

2.4 .3 Hydraulic damper-Both rods



2.4 .4 Hydraulic Damper-Stainless Steel



2.5 Special Gas Spring

Gastac will serve the successful experience of quality management of auto OEMs to serve customers in more different industries, including construction machinery, medical equipment, aviation manufacturing, mechanical processing, fitness equipment and furniture industries.

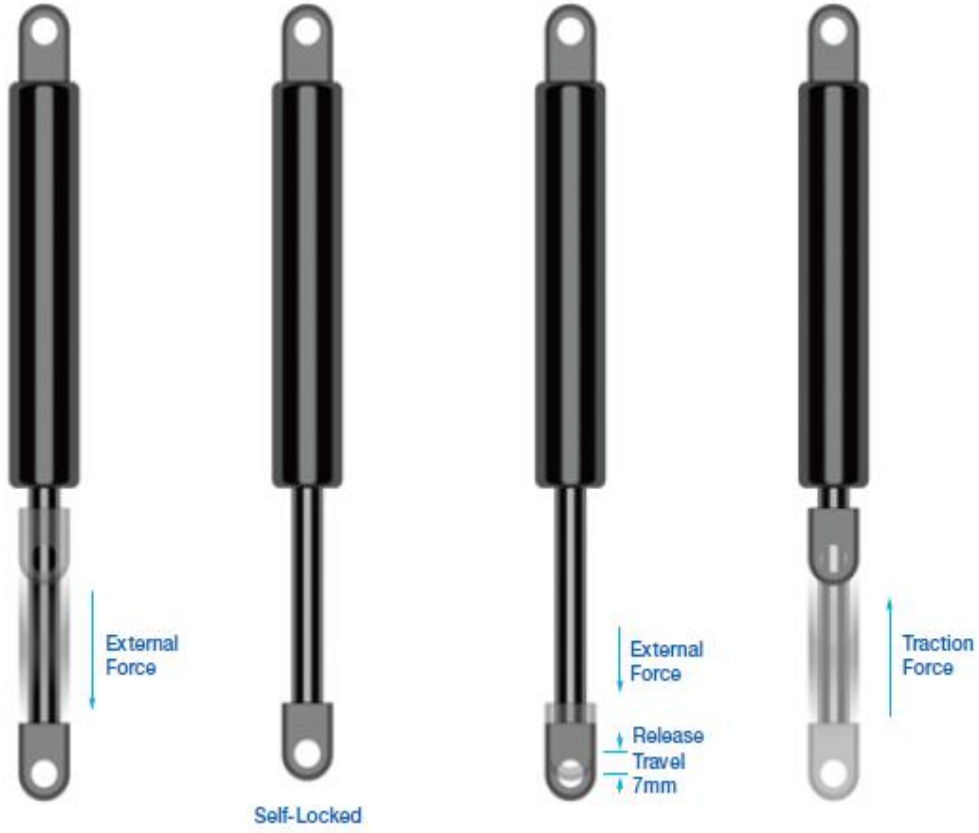
Gastac provides reliable products and solutions to make customers' final products work more efficiently.

Gastac damper has a flow limiting slot with variable damping, which makes it easier for customers to achieve the best damping effect. At the same time, this damper has a very good performance in service life.

2.5 .1 Gas Spring Auto-Locked in compression

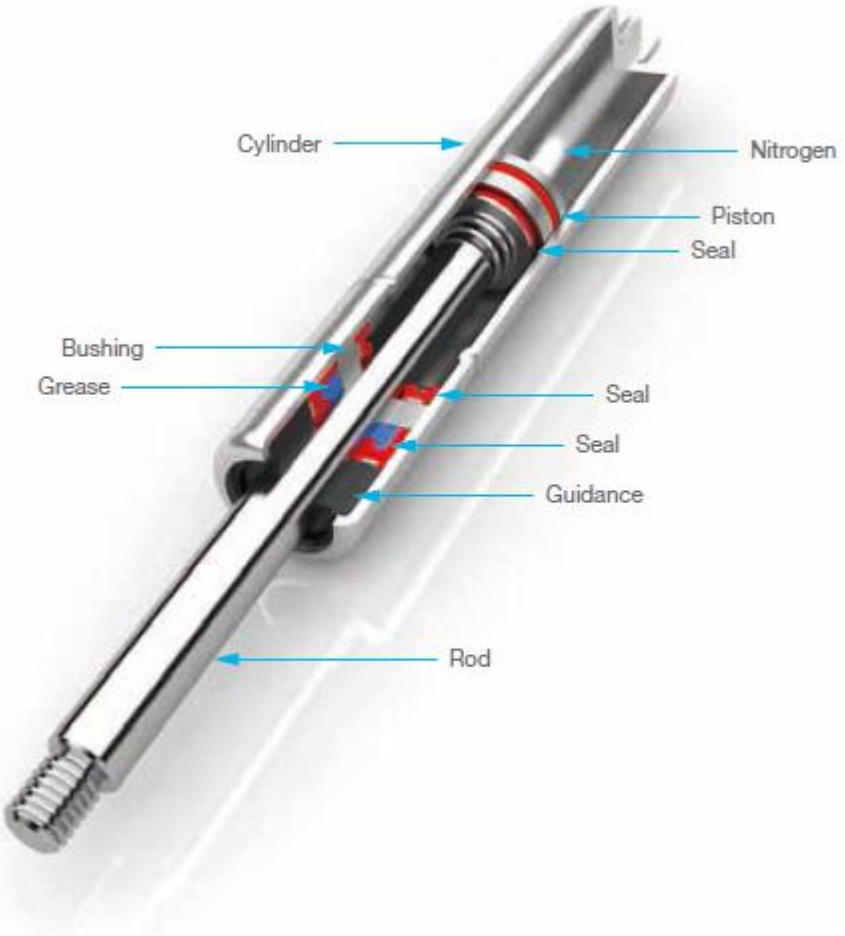
Standard Gas Spring | Pulling Gas Spring | Locking Gas Spring | Hydraulic Damper | Special Gas Spring

2.5.2 Gas Spring Auto-Locked in extension



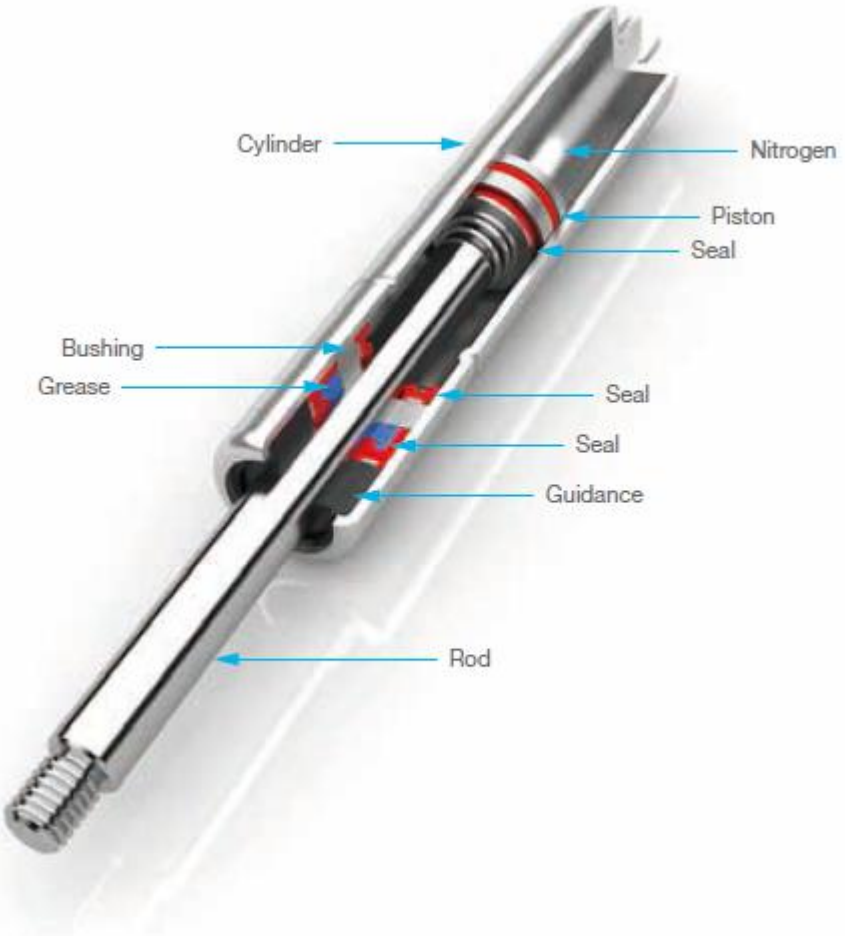
2.5.3 Compressed Gas Spring-Protective sleeve

2.5.4 Balance (Random stop) gas spring



2.5.5 Mini gas spring

2.5.6 High Speed Gas Spring



2.5.7 Others

Third、Gas Spring Production Process and Quality Control

3.1 Gastac Quality Control

Gastac Process flow chart

Sample ☐ / Pilot production ☐ / Production ☐	Main contact person:	Customer:	Edit/date:
Product name:	Supplier approval date:	Vendor Code:	Modify/date:
Part number/changed level finally:	Main members of the project team:		

process No.	produce	move	store/get	inspect	rework	out-souring factory	scrap/contra in	change	process	level	product property (output)	level	process property (input)
	◇	○	△	□	⬠	✹	⬣						
1	◇								Steel tube cutting		L= ±0.5		Work pressure0.5Mpa
1,1				□					Dimension-checking		L= ±0.5		
1.2		○							Revolving next step		L= ±0.5		Turnover quantity
2	◇								Set the length and flat end face		L= ±0.5		Work pressure0.5Mpa
2.1				□					Check the appearance		Without overlap and burr		
2.2		○							Revolving next step		Surface without chips, scratches		Turnover quantity
3	◇								Steel tube cleaning		Surface without chips, scratches		
3.1				□					Check the tube inner surface		Smooth surface, no Concave pit, scratch		
3.2		○							Revolving next step		placed neatly, without chips, scratches		Turnover quantity
4	◇								Steel tube cleaning		Smooth surface, no impurities attached		Fluid PH6~7
4.1		○							Turnover to machining		Smooth surface, no impurities attached		Identity card, transfer card
5	◇								Parts clean		Smooth surface, no impurities attached		
5.1		○							Turnover to machining		Smooth surface, no impurities attached		
6	◇								Steel tube expanding		expanding diameter±0.3		
7	◇								Back Plug argon welder.		placed neatly, smooth welds, without blowhole		
7.1				□					Surface inspection		Surface without burr, blowhole.		
7.2		○							Turnover to set assembling		placed neatly, without chips,scratches		Over tote cart are not allowed on the plane
8	◇								Piston rod assembly riveted		Assemble sequence:guide sleeve-seal-fixing ring-spacer1-piston ring-piston-spacer2		Seals put into from the piston rod riveting end,Riveting time2S,riveting pressure5MPa。
8.1				□					Riveted checking		After the riveting,the piston rod end diameter ±0.5		Manual twist the piston,can't move
8.2		○							Turnover to set assembling		placed neatly, without chips, scratches		Do not allow the interlayer stacked, carrying prohibited clash and fallen.
9	◇								Subassembly oil filling		The piston rod component assembly to the steel tube		Oil filling level 2ml
9.1	◇								checking after the assemble		to pull is no sticking after assembly		Over tote cart are not allowed on the plane
9.2		○							Turnover to groove and sealing machine		placed neatly, without chips, scratches		Over tote cart are not allowed on the plane
10	◇								Shrink and groove		stroke ±1, smooth surface without burr		Surface without overlap, burr
10.1				□					checking afer shrink and groove		Shrink diameter ±0.5, groove depth ±0.1, stroke ±1		Surface without overlap, burr
10.2		○							Turnover to nitrogen gas filling		placed neatly, without chips, scratches		Over tote cart are not allowed on the plane
11	◇								nitrogen gas charging		Force F1= N tolearance		Pressure MPa±1MPa,nitrogen gas charging
11.1	◇								testing gas spring force		F1= N tolearance		Load for 2S Read numbers
11.2		○							Turnover to bonderite step		placed neatly, fill in the identity card, chips, scratches		Over tote cart are not allowed on the plane
12	◇								Sheathing installation		Installed well to position.		Sheathed close contact with the guide bushing groove
12.1	◇								Surface treatment		Phosphating coating uniformity		Temperature45±5C°, time 10min±2min
12.2				□					Surface treatment to check		Phosphating coating uniformity		Placed no more than 12h after phosphating.
12.3	◇								Sheath removal		Placed neatly		Not permitted beyond the material tank plane
12.4		○							Turnover to the spraying process		Placed neatly, fill in the identity card, without knock against scratches		Over tote cart are not allowed on the plane
13	◇								Sheathing installation		Installed well to position.		Sheathed close contact with the guide bushing groove
14	◇								Steel Tube surfaces painted.		Smooth surface, no sagging		The piston rod surface with paint adhesion is prohibited.
14.1				□					Appearance inspection		Smooth surface, no sagging, orange peel, shrinkage hole, paint drops.		Brightness is not permitted in visual color difference
14.2	◇								Sheath removal		Placed neatly		Not permitted beyond the material tank plane
14.3	◇								Paint hotting		Smooth surface, no sagging, orange peel, shrinkage hole, paint drops.		hotting temperature 80±5C°, line speed 600r/min±50.
14.4		○							Flow to the packing		neatly, fill in the identity card, without knock against scratches		Over tote cart are not allowed on the plane
15	◇								Label printing		printing clearly		After printing logo from plugging＞15mm
15.1				□					gas spring surface inspection		The logo are clear and complete a smooth surface, without knock against, scratch, sag, impurities attached		Identify visual is not allowed to tilt gas spring shaft center
15.2		○							Turnover to the load process		placed neatly, interlayer with corrugated paper isolation, without knock against scratches		Put the layer number of no more than 6 layers
16	◇								Force testing		Force F1= N tolerance		Load for 2 s read numbers
16.1		○							Turnover to the sheath assembly procedure		placed neatly, without chips, scratches		Put the layer number, no more than 1 layers
17	◇								sheath Assembly		plastic Sheath without scratches and burr, and steel tube being connected closely		Sheath without cracking and deformation
17.1		○							Turnover to the preloading process		placed neatly, without chips, scratches		Put the layer number, no more than 1 layers
18	◇								fatigue testing		without abnormal sound, sticking, and vibration.		fatigue testing 6 times
18.1		○							Turnover to the ball joint assembly		placed neatly, without chips, scratches		
19	◇								Plastic ball joint assembly packaging		Ball joint no scratch, burr.		Ball joint with no falling out
20				□					Ex-factory inspection		According to the size		GB2828 spot check
21		○							Storage		placed neatly, without chips, scratches		The correct number consistent with the receipt number

3.2 Gastac Quality Control

Ningbo Gastac Gas Spring Co., Ltd

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Gastac Process of potential failure mode and consequence analysis (FMEA)

FMEA itemized:

Page 1 code:

Project name: Tailgate left gas spring assembly | Process responsibility department: Technology department | Editor:

Model year/vehicle type: B20A | Main date: 2016/4/15 | FMEA date:

core team:

Process of functional requirement	Potential failure mode	Failure of potential consequences	Serious degree（S）	Level	Potential failure cause/mechanism	Occurrence（O）	Current process control	Cannot detect degree（D）	Risk priority number（RPN）	recommended actions	Responsibility and Completion Date	Action Results				
												Action	Serious degree（S）	Occurrence（O）	Cannot detect degree（D）	risk degree of order(RPN)
Plastic ball	Size is big different with stand	Affect the assembly	3		Injection molding temperature is not reach the standard	2	PID temperature controller	2	12							
Piston rod	Size is big different with stand	Affecting the lifetime of the product	3		Soft polishing wheel wear	2	Each class to check	2	12							
Sheath	Burr on sheat	Appearance effects	2		Mould clamping force is insufficient	2	PCcomputer control pressure alarm	2	8							
Guide bush	Size is big different with stand	Affecting the lifetime of the product	3		Injection molding temperature is not reach the standard	2	PID temperature controller	2	12							
The Seal	Size is big different with stand	Affecting the lifetime of the product	3		vulcanization temperature is low	2	PID temperature controller	2	12							
Piston cushion	Size is big different with stand	Affect product performance	3		Mould wear out	2	Each class to check	2	12							
Piston	Size is big different with stand	Product sound noise	3		Low cutting speed	2	Each class to check.	2	12							
Spacer bush	Size is big different with stand	Affect the assembly	3		Injection molding temperature is not reach standard	2	Each class to check.	2	12							
Sealing	Size is big different with stand	Unbuffered	3		Carbon powder paint	2	Each class to check.	2	12							
Damper Bush	Size is big different with stand	Affect product performance	2		Mould wear out	2	Each class to check.	2	8							
Cylinder	Size is big different with stand	Product sound noise	2		Mould wear out	2	Each class to check.	2	8							
Rack Plug	Size is big different with stand	Affect product performance	2		Low cutting speed	2	Each class to check.	2	8							
Lubricate oil	Impurities	Affect product performance	2		Oil filter broken	2	Each class to check.	2	8							
Tube Cutting	Size is big different with stand	Size of gas springs is wrong	3		position-setting is loose	2	LType fixed way	2	12							
Flat end-face	Tube has burrs	Affect the welding and appearance	3		the cutting tools wear out	2	Each class to check.	2	12							
Tube Cleaning	Impurities	Gas spring binding, speed is not consistent	4		Cleaning cloth is dirty	2	Tube inner inspection	2	16							
Tube oil cleaning	Impurities	Gas spring binding, speed is not consistent	4		Clean the dirty	2	Tube inner inspection	2	16							
Rack Plug assembly and weld	blowhole	Oil leakage, gas leakage	3		negative poor contact	2	Appearance inspection	2	12							
Piston rod assembly and rivet	After starting work and a sound at the end	Small amount of riveted	3		Riveting time is short	2	Power on self test	2	12							
Subassembly oil filling	No oil filling	No buffer,no binding	3		Cylinder is not touch the start signal	2	Each class to check	2	12							

Gastac Process of potential failure mode and consequence analysis (FMEA)

FMEA itemized:

Page 1 code:

Project name: Tailgate left gas spring assembly | Process responsibility department: Technology department | Editor:

Model year/vehicle type: B20A | Main date: 2016/4/15 | FMEA date:

core team:

Process of functional requirement	Potential failure mode	Failure of potential consequences	Serious degree（S）	Level	Potential failure cause/mechanism	Occurrence（O）	Current process control	Cannot detect degree（D）	Risk priority number（RPN）	recommended actions	Responsibility and Completion Date	Action Results				
												Action	Serious degree（S）	Occurrence（O）	Cannot detect degree（D）	risk degree of order(RPN)
Tube Sealing and grooving	Offset	make a noise	3		Fixture locating coaxial	3	Each class to check	2	18							
	Size variance	Affect overall length size	4		Positioning is loose	2	Each class to check	2	16							
	Burr	Appearance effects	4		Wheel wear	2	Each class to check	2	16							
Gas charging	Force overproof	strength big lead to back door closing force	5		High pressure valve adjustment is too large	3	Force value of detection	2	30							
		strength small led to the back door not designated position	5		Aeration time set up short	3		2	30							
Surface treatment	nonuniform phosphating coat	Gas spring will rust	5		Liquid temperature is low	3	Temperature sampling	2	30							
	hurt the seals	Oil leakage, gas leakage	5		Protective sleeve is not loaded to guide sleeve end face	4	Before checking	2	40							
	hurt the piston rod	Oil leakage, gas leakage	6		The liquid bring into the protection sleeve	4		2	48							
Cylinder surface Painting	Surface is not smooth, flowing, orange peel, shrinkage	The gas spring rust, affect the appearance	3		Painting speed is nonuniform	2	Pneumatic control	2	12							
Paint hotting	Paint is falling off	The gas spring rust, affect the appearance	3		Low temperature	2	Gauge control	2	12							
Label printing	label illegible	Affected batches back	3		High concentrations of printing ink	2	Each class to check	2	12							
Force testing	Force is not enough	Force is big,so as to back door closing	4		Actual Force is lower than F1 force	2	Each class to check	2	16							
		Force is small,so as to the back door not support enough	4		Actual Force is lower than F2 force	2	Each class to check	2	16							
Prepressing	Vibration, noise, speed is inconsistent	Gas spring vibration sound, speed fast or slow	6		Prepressing small stroke	2	Each class to check	2	24							
Ball joint assembly packaging	Ball stud direction is not correct	Cannot be mounted on the back door	4		Ball stud direction is not correct	2		2	16							
	Packing quantity is not correct	Missing parts can't assembly	3		Check for Errors	2	Weigh	2	12							
Ex-factory inspection	Appearance	influence gas spring installation , so as to influence consistency	3		Check for Errors	2	Inspection record	2	12							
	Overall length															
	Stroke															
	Force value															

3.3 Gastac Quality Control

Ningbo Gastac Gas Spring Co., Ltd

Tel:86-574-87008309 Fex:86-574-87008307

Process of potential failure mode and consequence analysis

FMEA Itemized:

Page 1 code:

Project name: Tailgate left gas spring assembly

Technology department

Editer:

Model year/vehicle type:

Main date:

FMEA date:

Core team:

Process of functional requirements	Potential failure mode	Failure of potential consequences	Serious degree（s）	Level	Potential failure cause/mechanism	Occurrence（o）	Current process control	Cannot detect degree（D）	Risk degree of order(RPN)	Recommended actions	Responsibility and Completion Date	Action Results				
												Action	Severity（S）	Occurrence(O)	Non - Detectable degree(D)	Risk degree of order(RPN)
Installation components : piston Rod, Piston,seals, guide block	Install wrong, install anti, scratch	Affect the quality,customer dissatisfaction	8		Raw materials are unstable	3	Each batch of warranty / inspection reports	3	72	nothing						
					Piston is not properly installed		Assembly Process card									
					Components have serious scratch		Storage, handling, process cards									
					Guide sleeve is not properly installed		Assembly Process card									
Surface painting	Tube Painting place have color difference	Affect the appearance, customer dissatisfaction	3		Uneven painting,the paint supplier's paint quality has a problem	3	According to technical requirements to check it is whether the paint meets the requirements	3	27	nothing						
	The tube painting has bubbles, wrinkles, a serious flow hanging	Affect the appearance, customer dissatisfaction	3		Operator operations are not standardized	3	According to the correct oil painting process	3	27	nothing						
Install ball joint, printing the mark	Surface quality and tensile strength is not up to the requirements , parts are not installed	Does not meet user's requirements and affect the appearance	4		Unqualified raw materials	3	Each batch of warranty / inspection reports	3	36	nothing						
					Parts installation is not in seat		Assembly Process card									
					Part of fixing bad		Manual setting									
					Parts are not easy to distinguish between the left and right parts		adjustment parts is easy to distinguish between left and right parts									
	Moving parts are not flexible	The function is Decreased	4		Unreasonable size	3	Readjustment	3	36	nothing						
	Printing does not meet the requirements	Does not meet user's requirements	4		Printed handwriting is not clear	3	Readjust and follow the process card guide	3	36	nothing						
					Incorrect printing position											

Ningbo Gastac Gas Spring Co., Ltd

Tel:86-574-87008309 Fex:86-574-87008307

Gastac Control Plan

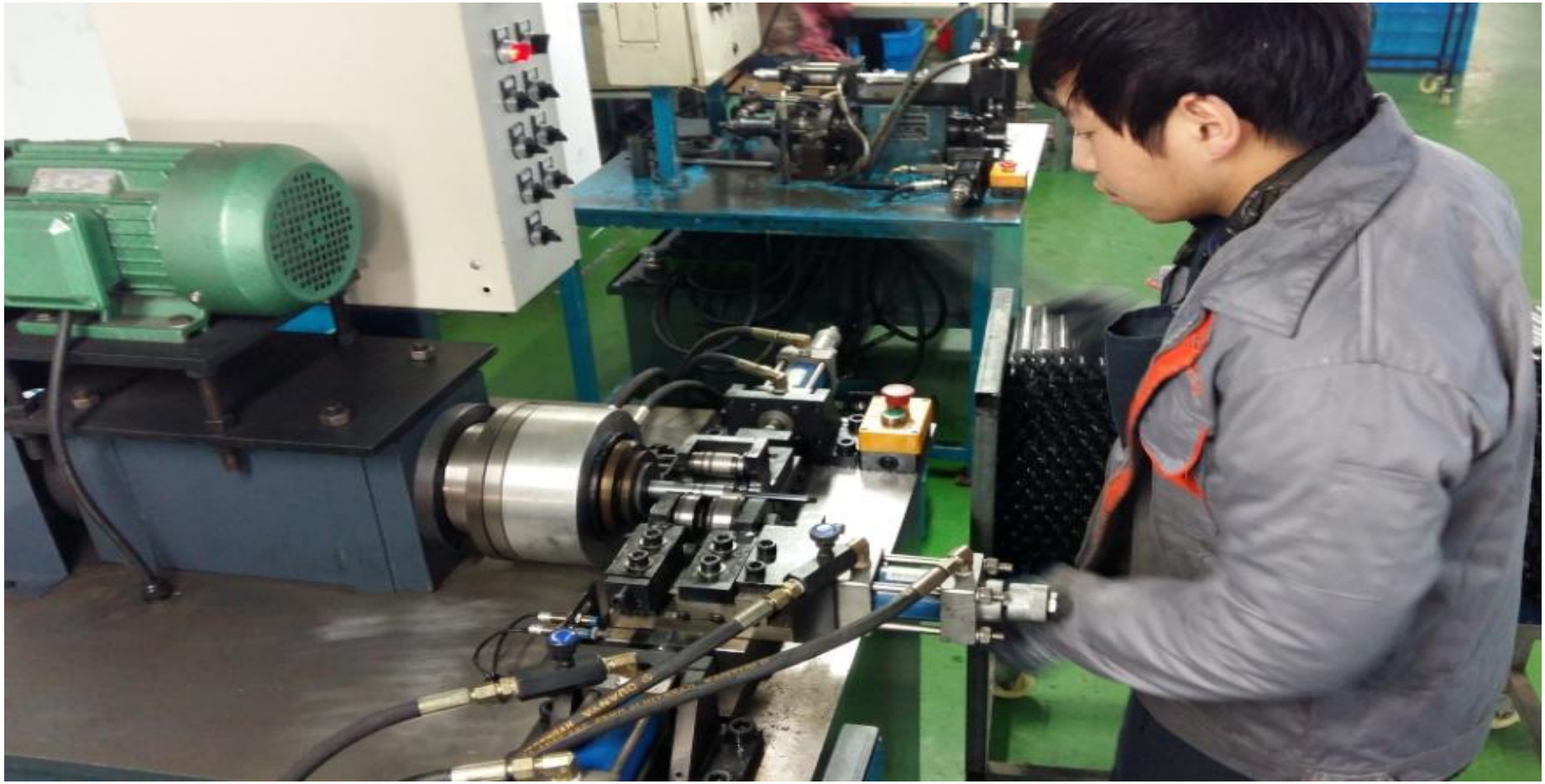
									SOR NO./Name:			Control Plan NO.:			
Part NO.:			Name of parts:		Model of car:		Vendor Name:		Editor by:			Phone:			
Core team:					Supplier approval/Date:		Customer approval/Date:		Date of establishment:			Latest modification			
Process NO	Operational Descraption	Machine、equipment、tooling、fixture	Prop NO.	Item parameter	Process	Special Characteristic classification	Method Product tolerance	Method of measurement	sample size	sample frequency	person in charge	controlling method	Operating procelure	Reaction Plan	
1	steel tube cutting	steel tube cutting	1	length L= ±0.5	work pressure 0.5MPa			steel rulers(0.5 scale)	5pcs	First and End piece		check list/inspection record	Cutting tube segment	rework	
		tote cart	1.2		revolving next step		Turnover quantity identification	visualization		100%		The next process check the last	LCQG-1		
2	Fixed length flat chamfer	Double head chamfering machine	1	length L= ±0.5	work pressure	◇		Caliper	5pcs	First and End piece		checking list		rework	
		Turnover table	1.2		revolving next step		Turnover quantity identification	visualization		100%		The next process check the last			
3	Steel tube cleaning	automatic washing machine	1	Appearance	inner surface inspection		Surface without chips, scratches	visualization		100%		flow card		rework	
		tote cart	1.2		quantity		quantity indentification	visualization							
4	Steel tube check	customize checking	1	Appearance	inner surface inspection		Smooth surface, no impurities	visualization		100%		flow card		rework	
		tote cart	1.2		quantity		quantity indentification	visualization							
5	Parts clean	Ultrasonic cleaning machin	1	Appearance			Smooth surface, no impurities	visualization		100%		flow card	LCJJ-1 Machining sectionL	rework	
		tote cart	1.1		quantity		quantity indentification	visualization							
7	Back Plug argon welder.	argon welder	1	Appearance	electric current		Smooth surface,without blowhole	visualization		100%		Inspection record	CJJ-1	rework	
9	The piston rod assembly and riveting, and clean,dry	Riveting machine	1		After riveting, diameter±0.5		Riveting time 2S, pressure 4MPa	caliper		100%		meter control		isolate	
			1.2		No loosening		spacer1-piston ring-piston-spacer2	visualization		100%		flow card			
10	sub assembly	oiling machine、work platform		property	Oil injection 2ml		to pull is no sticking after assembly	counting cup	5pcs	First and End piece					
11	Shrink and groove	Shrink and groove machine		stroke ±1		◇	Smooth surface	Ruler	5pcs	First and End piece		inspection record			
12	gas charging	Nitrogen gas Filling	1	force			gas charging time 5S±1S	Force measuring	100%	continuity		inspection record		rework	
		Force Testing	1.2	force and speed	stroke draught of gas spring	◇	F1= N+ N/- N speed:			continuity		inspection record			
		tote cart	1.3		quantity identification		quantity identification	visualization							
13	surface treatment	Phosphating pool	1				Sheath installation	visualization							
			1.2	Appearance	Temperature45±5 C°,		Phosphating coating uniformity	Thermometer	5pcs	First and End		inspection record	Phosphate segment		
			1.3				Placed neatly	visualization							
14	Steel Tube painted surfaces.	Painting Machine	1		sheath Installed well to position.		special sheath	visualization							
			1.2	Appearance			Spraying film thickness above 20mm,Smooth surface, no	thickness tester	5pcs	First and End piece		inspection record	Spray segment		
			1.3				Sheath removal,placed neatly	visualization		continuity					
15	Stoving varnish	Conveyor Lines		Appearance	Bake temperature 80℃		Smooth surface, no sagging, orange peel, shrinkage cavity,	visualization		continuity		flow card		rework	
16	Label printing	screen printing machine		Appearance	Clear handwriting		Smooth screen templates	visualization		continuity			Packaging segment		
17	Testing force and speed,locking force(Stocked 3 days after)	Force Testing machine		force and speed	10±1mm stroke draught of gas spring 10±1mm	◇	forceF1= N± N speed:	Force measuring instrument	100%	continuity		inspection record			
18	installe sheath	Sheathed Press Machine		Appearance			Sheath without scratches burr, and steel tube being connected	visualization	·	continuity					
19	Fight fatigue machine	Fatigue machine		Property	Pre-press 6 times		Abnormal sound, seizure, and vibration.	visualization	100%	continuity					
20	ball joint assembly packaging	Ball Stud Installation			ball head assembly direction90°,			visualization	100%	continuity					
21	Ex-factory inspection	checkout stand		Appearance	without chips, scratches			visualization		GB2828		EX-Factory Inspection Records,report			
				Total length	±2			steel rulers							
				stroke	±1			steel rulers							
				Force	F1= N± N			Force measuring							

Fourth、Production and Testing equipment

4.1 Gastac Machine—Tube slot broachking

Automatic Servo slot broaching machine

Semi-automatic Tube closing and rolling machine



High Precision Gas Filling Machine

4. 4 Gastac Machine—Gas spring Painting

Fully automatic electrostatic painting line

4. 5 Gastac Machine—Gas spring Painting

Leveling baking line

4.6 Gastac Machine—Packing and Assemble line

4.7 Gastac Machine—Salt Spray Machine

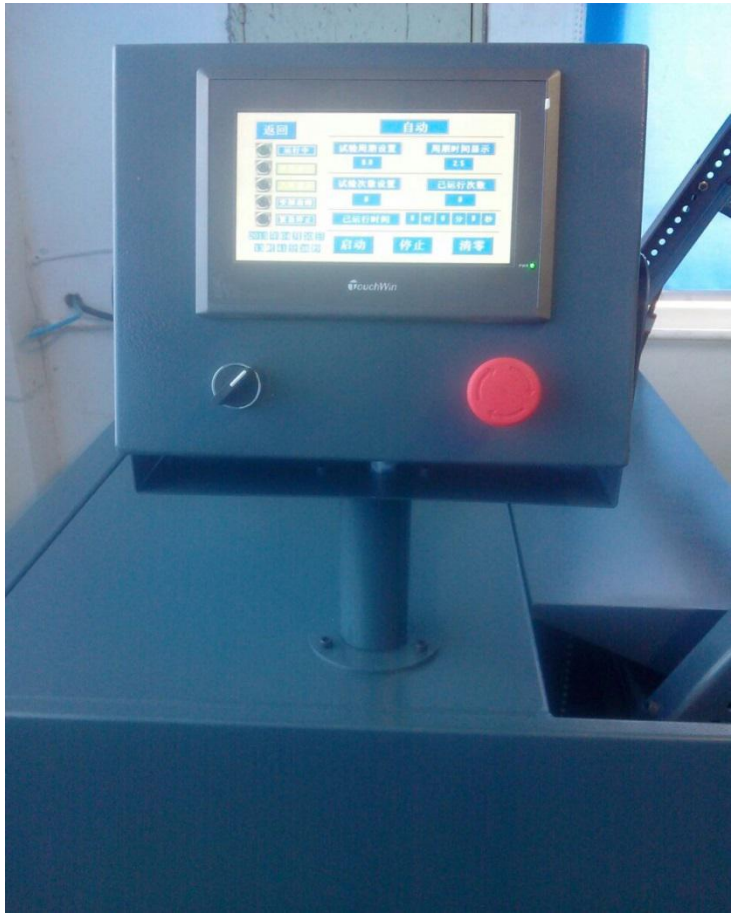
4.8 Gastac Testing Machine-Force Character Testing mach

4.9 Gastac Testing Machine

Gas Spring High and Low temperature dynamic testing machine

4.10 Gastac Testing Machine

Gas Spring fatigure testing machine



Dear Friends

Thank you for your attention and support to Ningbo gastac gas spring Co., Ltd again! Gastac gas spring has achieved a production capacity of more than 3.5 million pieces / year and an actual sales volume of 1.6 million pieces / year with the care and help of many OEMs and new and old friends after years of struggle, competition and growth.

Gastac insist on one goal - to maintain the high quality of products, we are looking forward to hearing from you at any time! Thank you!!

Best wishes,

Ningbo Gastac Gas Spring Co.,Ltd