Sanatron Acrylic Vacuum Chamber

Operations, Maintenance, and User Manual





Table of Contents

1. Introduction	3
2. Taking Care of your Acrylic Vacuum Chamber	ł
3. How to Clean the Acrylic Vessel	5
4. Vacuum Chamber Specifications	5
A. Vacuum Rating	5
B. Physical Properties	5
C. Environmental Conditions for Operations	5
5. Acrylic Vacuum Chamber Operations	7
A. Receiving and Unpacking your Chamber	7
B. Connecting your Vacuum Chamber to the Vacuum Pump	3
C. Explanation of Vacuum Chamber Components11	L
D. Creating Vacuum inside your Vacuum Chamber14	ł
E. Releasing Vacuum and Venting your Vacuum Chamber14	ł
F. Pressurizing your Chamber15	5
6. Conversion Tables	5
A. Pressure and Vacuum Conversion Table	5
B. Altitude vs. Pressure Conversion Table	7
Appendix A: Adjusting Door Hinges	3
Appendix B: Replacing your O-Ring)
Appendix C: Replacing the Spring Support Cylinder	l



426 South 1000 East STE708 Salt Lake City, UT 84102



1. Introduction

On behalf of Team Sanatron, we want to thank you for purchasing our products and letting us serve you. It is because of your support that we at Sanatron get to do what we are passionate about.

Our goal is to be your partner when it comes to vacuum technology. We are happy to help you design and build the world as we see it today. We also want to inspire you to rise above and to envision, develop, and build engineering systems for a better future tomorrow which seemed almost impossible today.

We stand 100% behind everything we make and deliver to you! This means that you have our service when you need it. You are welcome to contact us whenever, regardless what questions you may have or what warranty terms and conditions say.

Every chamber is specified, designed, built, and quality inspected by us specifically for you. In order to get the most out of your chamber, please take the time to fully read and understand this document.

Following this Installation, Operations, and Maintenance Manual will:

- 1. Ensures an effective and efficient operation.
- 2. Prolong the life and quality of this equipment.
- 3. Maintain a safe and secure work environment.

LEGAL NOTICE: Sanatron makes no warranties applying to information contained in this document or its suitability for any implied or inferred purpose. Sanatron shall not be held liable for any errors this manual contains or for any damages that result from its use. By using this chamber or manual, the user/operator agrees to operate this chamber voluntarily, at own discretion, and at their own risk.

Operator must comply with safety instructions, observe workplace safety rules, and follow regulations issued by corresponding government agencies.

WARNING: Misuse of this equipment may result in equipment damage or personal injury.

DO NOT make unapproved modifications to this chamber



426 South 1000 East STE708 Salt Lake City, UT 84102



2. Taking Care of your Acrylic Vacuum Chamber

WARNING: HEAVY!

Consider that the smallest and lightest Sanatron Acrylic Vacuum Chamber weights 35lbs or more. Please use the proper lifting and moving equipment while relocating your Chamber. Do not try to lift this Acrylic Chamber by yourself. Use the same procedures that you would use when handling heavy equipment. Consult your on-site Safety Engineer or Material Handler if you are not sure how to move heavy and fragile equipment.

WARNING: FRAGILE!

Acrylic is fragile and will crack or craze if dropped or mishandled. You must set your Acrylic Vacuum Chamber slowly down onto your work area. Additionally, do not hit it with sharp objects such as knifes, hammers, or screwdrivers. Do not collide this system with other objects. You must handle the acrylic carefully in order to maintain it.

ATTENTION! DO NOT use, apply, or expose SOLVENTS to Acrylic Chambers

Solvents have the ability to attack the surface of acrylics and dissolve the polymer chains which are the building blocks or acrylic. Not only will solvents dissolve acrylic and acrylic epoxy glue, solvents will also diffuse into the acrylic and acrylic glue and weaken it.

This includes, but is not limited to: isopropyl alcohol, acetone, paint thinners, and other solvents. Please do not use this chamber for Wood Impregnation as some Wood Resins outgas and the vapor from the wood resin will attack the acrylic and the acrylic epoxy glue and destabilize the acrylic vacuum chamber.

DO NOT use this chamber to dry parts that have been cleaned with including, but not limited to: isopropyl alcohol, acetone, paint thinners, and other solvents. The solvent drying vapors will attack the acrylic and the acrylic epoxy glue and weaken the acrylic vacuum chamber.



426 South 1000 East STE708 Salt Lake City, UT 84102



3. How to Clean the Acrylic Vessel

DO NOT USE SOLVENTS such as Alcohol, Acetone, or Chemical Thinners. These will Damage and Craze your Acrylic and make it opaque making it difficult for you to see bubbles.

Approved Cleaning Methods are:

- 1. Water and Hand Soap
- 2. NOVUS, #1 Acrylic Cleaner

Use a lint free cloth by soaking or submersing it into water or soap water. Squeeze the water out of the cloth so that you end up with a damp cloth (containing water or soap water or #1 Acrylic Cleaner).

With the damp cloth, sweep across the acrylic surface until the dirt or dust have been picked up. Be careful not to scratch the acrylic.

Once you have swept your acrylic surface, use a dry cloth or paper towel to soak up the moisture from the acrylic surface. Finally, you can wipe off the wet surface with a dry cloth.

Finally, be sure NOT to use any soap which may contain alcohol or solvents.











426 South 1000 East STE708 Salt Lake City, UT 84102



4. Vacuum Chamber Specifications

A. Vacuum Rating

- All Acrylic Vacuum Chambers are rated to 0.075 Torr of absolute Pressure with the appropriate vacuum pump. This chamber will pull to 75 micron, -29.92 inHg, -14.69 psi, -101kPa.

- The highest vacuum you can pull is dependent on two things:

<u>1. Your altitude and the ambient pressure:</u> You can only pull as much air as is present in the chamber. At higher altitudes, the vacuum you can pull is lower

<u>2. Your Vacuum Pump:</u> The vacuum level is also Dependent on the vacuum pump you have. Make sure that you have a powerful enough pump to handle this acrylic vacuum chamber.

- The leak rate of this acrylic vacuum chamber is no less than 5.25 Torr (0.25 inHg) within the first 24 hours. This chamber will not lose much pressure after 24 hours and will hold the vacuum level steady for several weeks.

- The internal dimensional tolerances of this chamber are +/-0.125 inch.

- Unless otherwise noted or requested in the quote, the chamber materials and the lid materials are made from Clear Cast Acrylic.

- The Standard Sealing Material is a Buna-N 1/4 inch (0.275" Actual) diameter O-Ring. Viton and other types of O-Rings are available upon Request.

B. Physical Properties

The chamber approximate weight, typical outside dimensions, and O-Ring Sizing are show in table below:

Vacuum Chamber Inside Dimensions	Weight (pounds)	Approximate Outside Dimensions W x D x H (inch)	O-Ring Size (Dash Number)*
Cube, 10 inch	35	16x13x14	455
Cube, 12 inch	50	20x15x16	460
Cube, 14 inch	80	22x16x17	465
Cube, 16 inch	95	24x20x18	469
Cube, 18 inch	125	26x22x20	472
Cube, 20 inch	155	27x24x22	474
Cylinder, 8 inch ID	10	10x12	444
Cylinder, 10 inch ID	15	12x13	448
Cylinder, 12 inch ID	21	14x14	451

* See APPENDIX B on instructions how to replace your O-Ring

C. Environmental Conditions for Operations

- This acrylic vacuum chamber is designed to be operated throughout all humidity levels.

- The temperature range for this chamber is -100 °C to 41°C (-150F to 104F)



426 South 1000 East STE708 Salt Lake City, UT 84102



5. Acrylic Vacuum Chamber Operations

A. Receiving and Unpacking your Chamber

Depending on the size, weight and complexity of your system, your vacuum chamber will arrive either in a box, crate, or pallet. Please be sure to unpack your item as soon as you can so that any damages incurred during freight can be handled quickly.

During your unpacking process be sure to inspect your item for damages. If you find your item to be damaged, please contact us and depending on the shipping terms, we will either help you resolve your case or refer you to the freight company.

Note that your chamber will be wrapped into packaging wrap, be extra careful removing it and if you are using a knife to cut the wrap, be sure not to cut or scratch the vacuum chamber. KEEP THE KNIFE AWAY FROM ACRYLIC. DO NOT SCRATCH ACRYLIC CHAMBER.

Finally, be sure to handle your chamber with care as it is heavy.

As you unpack your vacuum chamber, you may notice Styrofoam pieces, saw dust, and heavy glue smell. The Styrofoam and sawdust are easy to clean. The glue smell may be present because your chamber is built in house and made to order and is still fresh. This smell will slowly decrease and become unnoticeable after a week or two.



BE CAREFUL REMOVING THE PACKAGING WRAP. DO NOT SCRATCH ACRYLIC WITH KNIFE BLADE

YOUR CHAMBER ASAP



426 South 1000 East STE708 Salt Lake City, UT 84102



B. Connecting your Vacuum Chamber to the Vacuum Pump

This acrylic vacuum chamber is fully setup and ready to go; all you need to do is to connect the acrylic vacuum chamber to the vacuum pump. Please see the sketch below to understand how the vacuum chamber connects to the vacuum pump.



There are two most common ways to connect the vacuum pump to the vacuum chamber:





426 South 1000 East STE708 Salt Lake City, UT 84102



Barb Fitting: A barb Fitting is required to connect the vacuum chamber and vacuum pump. Since our standard vacuum valve is a 1/4 inch NPT, we suggest that you use a Barb that is 1/4 inch Male NPT by 3/8 Hose Diameter ID. You will also need a barb hose clamp. Repeat the same process for the vacuum pump.



NW Quick Flange: This is also an option that you have which is a bit better as it will decrease your pump-down times due to larger diameter hose. As an option we offer NW25 and NW40 Valve that can be connected to your chamber via a Metal Bellows Hose either NW25 or NW40. You will also need a Centering Ring and a Clamp.





426 South 1000 East STE708 Salt Lake City, UT 84102



Once you have connected your vacuum chamber with vacuum pump properly, it should look like the image below. Please see the images below as a reference to confirm that you have connected your vacuum chamber to vacuum pump:







426 South 1000 East STE708 Salt Lake City, UT 84102



C. Explanation of Vacuum Chamber Components

Your Vacuum Chamber comes with a Venting Valve, a Vacuum Gauge, and a Vacuum Valve.





426 South 1000 East STE708 Salt Lake City, UT 84102



Lid Clamp is a toggle style clamp that is used to press the Lid and compress the O-Ring against the sealing surface. Most of the time, this clamp is use to initiate the vacuum at first. Once you have reached a -1psi vacuum, the vacuum force will create sufficient force to hold the O-Ring Sufficiently Compressed against the sealing surface.

The Top Load, Removable Lid Model has 4 clamps, the Hinged Side Door, Front Loading Model has 2, and the Spring Supported Lid has also 2 Clamps.

<u>The Lid Handle</u> is used to properly hold and move the vacuum chamber lid. Grab the lid Handles firmly to lift the lid from the top of the vacuum chamber. Conversely, grip the handle to open the front load and spring supported chamber.

Door Hinges are present to hold the door in place and to enable you to swing the door open. Your vacuum chamber hinges will not need adjustment during the lifetime of the vacuum chamber. However, the good news is that our door hinges are the only ones on the market that are adjustable. Please see Appendix A for instructions on how to adjust the Door Hinges.

The Venting Valve is not connected to anything, it is simply there to vent your chamber once you are ready to release your vacuum. You may connect a muffler or a filter onto it so that you can prevent impurities rushing into your chamber as you are releasing your vacuum. In some instances, your venting valve can be used to control the vacuum levels inside your chamber. The way to do this is to not fully open the venting valve and watch the vacuum gauge reach your desired vacuum level. Once your desired vacuum level has been reached, watch the dial, if it moves toward higher vacuum, open your venting valve a bit more. If on the other hand, you are unable to reach your desired vacuum level, close the vacuum valve a bit more. You will have to play with it a little bit but once you have dialed in your vacuum valve position, you will not need to adjust your vacuum anymore.

A better way to do this vacuum control is to get a vacuum controller or a vacuum control valve installed on your system.

The Vacuum Gauge shows the vacuum level inside of your chamber. Your Dial Vacuum gauge comes with a 2% to 3% accuracy and is not calibrated. If you need your vacuum gauge calibrated or if you need your vacuum gauge to be quick release as shown in image below, please contact us and we will add this to your system as an option.

If you require a higher resolution vacuum display; we recommend that you install a Instrutech Stinger Gauge. This vacuum gauge is electrically powered and will display a vacuum output in Torr with 3 significant figures of accuracy. Once your vacuum level goes below 1 Torr, the vacuum display will switch to micro Torr (micron) output. This is a recommended option if you require a more accurate vacuum measurement.



426 South 1000 East STE708 Salt Lake City, UT 84102



Vacuum Gauge Options



Shown are two options.

First is the quick release option that will allow for easy and periodic vacuum gauge calibration.

The Second Option is the Instrutech Vacuum Gauge option which allows you to display your vacuum inside the acrylic vacuum chamber in Torr and with an accuracy of 3 significant figures.

The Vacuum Valve, which is connected to the Vacuum Pump is used to let the air be evacuated from the chamber.



426 South 1000 East STE708 Salt Lake City, UT 84102



D. Creating Vacuum inside your Vacuum Chamber

To create a Vacuum, simply:

- 1. Close the lid
- 2. Close clamps so that slight pressure is applied to the Lid and O-Ring.
- 3. Close the Venting Valve (the valve not connected to anything)
- 4. Turn ON the Vacuum Pump.
- 5. Open the Vacuum Valve (the valve that is connects the Vacuum Pump to your Vacuum Chamber)
- 6. Watch the vacuum gauge display and notice your vacuum increasing. Once you have reached your desired vacuum level, close the vacuum valve and hold your vacuum as long as you need to. Our vacuum chambers are designed to hold vacuum for an extended period of time.

E. Releasing Vacuum and Venting your Vacuum Chamber

Once you are done with operating your vacuum chamber, all you have to do is:

- 1. Open the Venting Valve and let the vacuum release (you will hear air rushing into your chamber).
- 2. Turn OFF the Vacuum Pump
- 3. Close the Vacuum Valve (the valve that is connects the Vacuum Pump to your Vacuum Chamber)
- 4. Keep the Venting Valve Open and Open or Remove the Lid.

Congratulations, you have successfully operated your acrylic vacuum chamber!



426 South 1000 East STE708 Salt Lake City, UT 84102



F. Pressurizing your Chamber

Your acrylic vacuum chamber can be pressurized, if you have purchased the OVERPRESSURE OPTION. The pressurization process is simple, simply connect your valve to compressed air source, but instead of vacuum, use compressed air instead.

The slight over-pressurization is usually 5psig, 10psig, or 15psig. This overpressure option enables for a broader and deeper application. Each over pressurization option comes with a vacuum rated pressure relief valve that will pop open at about 15% over the rated pressure in order to vent any additional chamber pressure and keep the system safe.







426 South 1000 East STE708 Salt Lake City, UT 84102



6. Conversion Tables

A. Pressure and Vacuum Conversion Table

Gauge	Absolute				Absolute	Gauge	Percent
Vacuum	Pressure	Vacuum	Vacuum	Vacuum	Pressure	Vacuum	Vacuum
(PSI)	(PSI)	(In. Hg)	(mbar)	(kPa)	(Torr)	(mm Hg)	(%)
0	14.70	0	0.0	0.0	760	0	0
0.49	14.24	1	33.9	3.4	735	25	3
0.98	13.75	2	67.7	6.8	709	51	7
1.47	13.26	3	101.6	10.2	684	76	10
1.96	12.76	4	135.4	13.5	658	102	13
2.45	12.27	5	169.3	16.9	633	127	17
2.95	11.78	6	203.2	20.3	608	152	20
3.44	11.29	7	237.0	23.7	582	178	23
3.93	10.80	8	270.9	27.1	557	203	26
4.42	10.31	9	304.7	30.5	531	229	30
4.91	9.82	10	338.6	33.9	506	254	33
5.4	9.33	11	372.5	37.2	481	279	36
5.89	8.84	12	406.3	40.6	455	305	40
6.38	8.35	13	440.2	44.0	430	330	43
6.87	7.86	14	474.0	47.4	404	356	46
7.36	7.36	15	507.9	50.8	379	381	50
7.86	6.87	16	541.8	54.2	354	406	53
8.35	6.38	17	575.6	57.6	328	432	56
8.84	5.89	18	609.5	60.9	303	457	59
9.33	5.40	19	643.3	64.3	277	483	63
9.82	4.91	20	677.2	67.7	252	508	66
10.31	4.42	21	711.1	71.1	227	533	69
10.8	3.93	22	744.9	74.5	201	559	73
11.29	3.44	23	778.8	77.9	176	584	76
11.78	2.95	24	812.6	81.3	150	610	79
12.27	2.45	25	846.5	84.7	125	635	83
12.76	1.96	26	880.4	88.0	100	660	86
13.26	1.47	27	914.2	91.4	74	686	89
13.75	0.98	28	948.1	94.8	49	711	92
14.24	0.49	29	981.9	98.2	23	737	96
14.7	0.00	29.92	1013.0	101.3	0	760	100



426 South 1000 East STE708 Salt Lake City, UT 84102



B. <u>Altitude vs. Pressure Conversion Table</u>

Altitude (ft)	Altitude (m)	Absolute Pressure (Torr)	Gauge Vacuum (inHg)	Altitude (ft)	Altitude (m)	Absolute Pressure (Torr)	Gauge Vacuum (inHg)
sea level	0	760.0	0.0				
1,000	305	733.0	1.0	32,000	9,754	205.3	21.8
2,000	610	706.6	2.1	33,000	10,058	197.1	22.1
3,000	914	681.2	3.1	34,000	10,363	187.9	22.5
4,000	1,219	656.3	4.1	35,000	10,668	179.3	22.8
5,000	1,524	632.5	5.0	36,000	10,973	170.9	23.2
6,000	1,829	609.1	5.9	37,000	11,278	162.8	23.5
7,000	2,134	586.5	6.8	38,000	11,582	155.5	23.8
8,000	2,438	564.6	7.7	39,000	11,887	148.1	24.1
9,000	2,743	543.3	8.5	40,000	12,192	141.2	24.3
10,000	3,048	522.7	9.3	41,000	12,497	134.6	24.6
11,000	3,353	502.9	10.1	42,000	12,802	128.3	24.8
12,000	3,658	483.4	10.9	43,000	13,106	122.2	25.1
13,000	3,962	464.8	11.6	44,000	13,411	116.6	25.3
14,000	4,267	446.5	12.3	45,000	13,716	111.3	25.5
15,000	4,572	429.0	13.0	46,000	14,021	105.9	25.7
16,000	4,877	412.0	13.7	47,000	14,326	101.1	25.9
17,000	5,182	395.7	14.3	48,000	14,630	96.27	26.1
18,000	5,486	379.7	15.0	49,000	14,935	91.69	26.3
19,000	5,791	364.5	15.5	50,000	15,240	87.38	26.5
20,000	6,096	349.5	16.1	51,000	15,545	83.31	26.6
21,000	6,401	335.3	16.7	52,000	15,850	79.50	26.8
22,000	6,706	321.3	17.3	53,000	16,154	75.69	26.9
23,000	7,010	307.9	17.8	54,000	16,459	72.14	27.1
24,000	7,315	294.9	18.3	55,000	16,764	68.83	27.2
25,000	7,620	282.5	18.8	56,000	17,069	65.79	27.3
26,000	7,925	270.3	19.3	57,000	17,374	62.48	27.4
27,000	8,230	258.6	19.7	58,000	17,678	59.09	27.6
28,000	8,534	247.4	20.2	59,000	17,983	56.90	27.7
29,000	8,839	236.5	20.6	60,000	18,288	54.36	27.8
30,000	9,144	226.1	21.0	61,000	18,593	51.82	27.9
31.000	9.449	216.2	21.4	62.000	18.898	49.28	28.0



426 South 1000 East STE708 Salt Lake City, UT 84102



Appendix A: Adjusting Door Hinges

Step 1: Tilt Chamber on its back.

Tilting the chamber on its back will allow you for better placement of the lid. Use wood blocks covered with either towels or Styrofoam in order to protect the acrylic from scratches when you tilt your chamber.

NOTE: Sometimes you will not be able to tilt the chamber onto its rear wall; in that case, we suggest that you use shims, spacers, ties, or other tools to place the door into its correct location. This operation requires that you have a spotter (another person) that will hold the door so that it does not fall backwards.





426 South 1000 East STE708 Salt Lake City, UT 84102



Step 2: Place the lid into its position

Manually place the lid onto its position. Check to make sure that all holes align properly.





426 South 1000 East STE708 Salt Lake City, UT 84102



Step 3: Fasten each of the Hinge Bolts

Fasten each of the Hinge Bolts. Do NOT tighten anything yet. Be sure to include the two nuts which you will later use to constrain the lid.





426 South 1000 East STE708 Salt Lake City, UT 84102



Step 4: Adjust the Hinge Bolts

Once you have fully fastened the hinge bolts, you will notice that the lid will lift on the other side close to the clamps. Be sure not to lift the lid more than 0.125 inch. The less the lid lifts, the more flat the door is placed.





426 South 1000 East STE708 Salt Lake City, UT 84102







426 South 1000 East STE708 Salt Lake City, UT 84102



Step 5: Clamp down the Toggle Clamps

Clamp The Toggle Clamps on the other side of the lid and finalize by carefully fastening the Hinge Bolts. You know that you have properly fastened the hinge bolts when all of the O-Ring is compressed.





426 South 1000 East STE708 Salt Lake City, UT 84102







426 South 1000 East STE708 Salt Lake City, UT 84102



Step 6: Unclamps the Toggle Clamps

If the lid does not lift more than 0.075" after unclamping the Toggle Clamps, you are not ready to fully tighten both of the hinge nuts.





426 South 1000 East STE708 Salt Lake City, UT 84102



Step 7: Fasten the Hinge Nuts.

Hold the Hinge Bolt stationary with an Allen Wrench to prevent it from turning. Tighten the bottom Hinge Nut first, then move onto the top hinge nut.





426 South 1000 East STE708 Salt Lake City, UT 84102



Sanatron Acrylic Vacuum Chamber Operations, Maintenance, and User Manual





426 South 1000 East STE708 Salt Lake City, UT 84102



Step: 8: Test the Door Opening Mechanism while the chamber is laying on its back

Unclamp the toggle Clamps and open the Door. Make sure that the door does not wiggle but that it is fully fastened. Close the door and make sure that you are able to close it properly. Also make sure that the O-Ring is slightly compressed when you are clamping your Toggle Clamps.

Step 9: Tilt the chamber back to its original position.

NOTE: You do not have to do this Step if you have not tilted the chamber onto its rear.

Step 10: Vacuum Test Your Chamber

Connect your chamber to a vacuum pump, pull a vacuum and test for pumpdown times. Listen and check for leaks. A this point, you should be good.



426 South 1000 East STE708 Salt Lake City, UT 84102



Appendix B: Replacing your O-Ring

The lifetime of your O-Ring depends on how often the vacuum chamber is used. Generally Speaking it should last you for many years. Fortunately, O-Rings are off-the-shelf and can be purchased from your local O-Ring supplier, online, or from Sanatron.

The suggested O-Ring Material is either Buna-N or Viton. See Table for O-Ring Sizing of your vacuum chambers below:

Vacuum Chamber Inside Dimensions	O-Ring Size (Dash Number)*
Cube, 10 inch	455
Cube, 12 inch	460
Cube, 14 inch	465
Cube, 16 inch	469
Cube, 18 inch	472
Cube, 20 inch	474
Cylinder, 8 inch ID	444
Cylinder, 10 inch ID	448
Cylinder, 12 inch ID	451

To REMOVE your O-Ring Simply follow the easy 5 step process:

<u>STEP 1</u>: Find the O-Ring NOTCH **<u>STEP 2</u>**: Place a flat head screwdriver or a picker into it **<u>STEP 3</u>**: Slowly push your screwdriver under the O-Ring and lift it

STEP 4: Grab the O-Ring with your Hand

<u>STEP 5:</u> Pull the O-Ring Out





426 South 1000 East STE708 Salt Lake City, UT 84102



To INSTALL your O-Ring Simply Press the O-Ring into the O-Ring Groove.

You start at one point and slowly work your way around the O-Ring Groove. You may have to stretch your O-Ring a little - that is OK. As you work your way around the O-Ring Groove, be sure to check to make sure that the O-Ring is fully inserted into the O-Ring Groove. In the end, run your fingers across the whole O-Ring and confirm that there are no bumps present. If bumps are present, simply push them in.

Congrats, your O-Ring is now fully installed!





426 South 1000 East STE708 Salt Lake City, UT 84102



Appendix C: Replacing the Spring Support Cylinder

There are some instances where you will have to replace the spring support cylinder on your vacuum chamber. Fortunately, this process is fairly straight forward.

Please Follow the simple 7 Steps below to release the gas spring out of the Ball Socket

<u>STEP 1</u>: Locate the Ball Socket at both ends of the Spring Support Cylinder

<u>STEP 2</u>: Take a small flat head screw driver and dig it under the Retaining Clip

<u>STEP 3</u>: Use the screwdriver head to pull the retaining clip back

STEP 4: As the Retaining clip is pulled back, pull on the ball socket to disconnect it from the ball stud

<u>STEP 5:</u> Push the retaining clip into place. Unscrew the ball socket from the old cylinder and screw it onto the new cylinder

<u>STEP 6:</u> Repeat steps 1 to 5 for the other ball socket

STEP 7: Pop the new cylinder with the screwed on ball sockets into the ball stud







426 South 1000 East STE708 Salt Lake City, UT 84102