



# Hydraulic Accumulators



Quality Assurance  
Guaranteed by  
ISO 9001 Certification

Manufactured design covered  
by 82 worldwide patents

The accumulator that is  
designed and made to  
last longer

The only complete line of  
“Top Loading” accumulators  
from 5 cubic inches  
to 40 gallons

**Wilkes & McLean Ltd.**

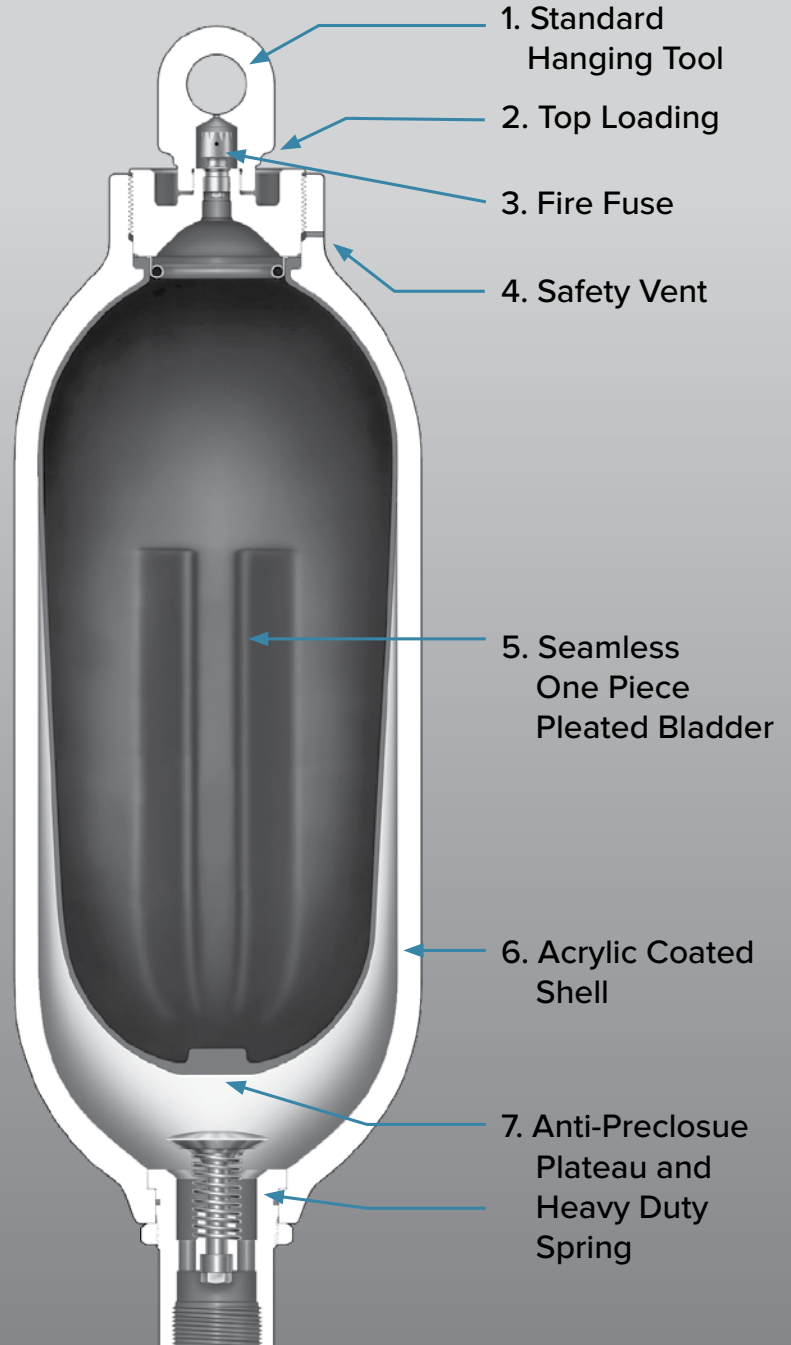
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[www.wilkesandmclean.com](http://www.wilkesandmclean.com)

# NACOL ACCUMULATORS — DESIGNED AND MADE TO LAST LONGER

## Wilkes and McLean's commitment to the North American Accumulator market

"All 3300 PSI accumulator sizes up to 15 gallons will always be in stock for immediate delivery." Wilkes and McLean, Nacol's Master distributor in North America, stocks all accumulator sizes in the 3000 P.S.I. line from 5 cubic inches to 15 gallons. In addition all replacement parts for all sizes will be readily available for shipment.

## 7 Reasons to Choose NACOL's Exclusive Patented Design:



### Definitions and illustrations of accumulator industry terms.

Terms you should know if you use accumulators.

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# TOP LOADING

"Top Loading" means the bladder can be taken out from the top of the accumulator if bladder repair is ever necessary

Changing a bladder is as easy as 1, 2, 3, with "Top Loading" accumulators.

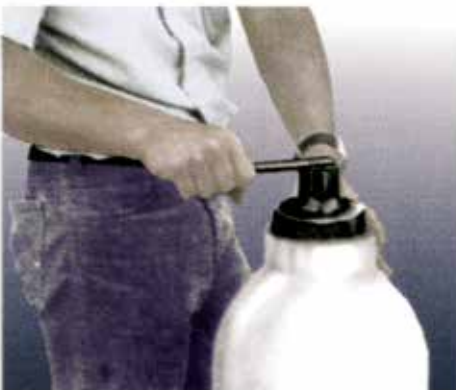
## 1. Remove Top



## 2. Take out bladder



## 3. Replace bladder



*This bank of accumulators is typical of NACOL accumulator installations*

"Top Loading" is an accumulator specification that will save you the most maintenance time and money

Changing a NACOL "Top Loading" accumulator bladder is as easy as the three pictures shown at the left.

With Nacol's extra large top cover opening it makes removing the old bladder much easier than all other accumulator brands.

However with "Bottom Loading" accumulators the entire accumulator must be first removed from the system. The larger size accumulators weigh over 300 lbs., so removing the accumulator from the system is no easy matter.

In addition to the weight of the accumulator to consider it is also often necessary to drain the entire hydraulic systems all of the oil does not leak out of the tank once the accumulator is removed.

# TOP LOADING FOR SMALL ACCUMULATORS

NACOL is the only company that makes "Top Loading" accumulators in these small sizes.  
(In addition to 1 1/2 Gallon to 40 Gallon)

## 3000 PSI Accumulators

### "Top Loading" Small Sizes:

1/5 pint, 1 Pint, 1 Quart, 1/2 Gallon, 1 Gallon



1/5 Pint / 1 Pint



1 Quart



1/2 Gallon



1 Gallon

## 5000 PSI Accumulators

### "Top Loading" Small Sizes:

1 Quart, 1/2 Gallon, 1 Gallon, 1 1/2 Gallon



1 Quart



1/2 Gallon



1 Gallon



1 1/2 Gallon

# PINCHED BLADDER

One of the major causes of accumulator failure

## Competitor's design

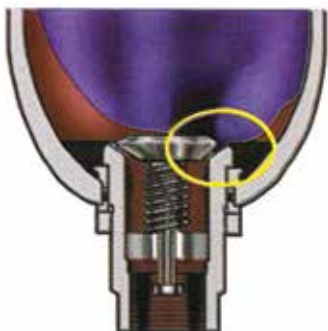


### What causes "Pinched Bladder"?

As oil flows out of the accumulator, the bladder comes in contact with the poppet at the bottom of the accumulator. The bladder starts to close the poppet which is being held open by a spring.



This photograph illustrates how the bladder can flow under the poppet while fluid is flowing out of the accumulator.



The bladder wraps around the poppet and forces the poppet down. Then the poppet closes on the bladder, pinching the bladder, causing a cut which results in accumulator failure.

## NACOL's design



### Why "Pinched Bladder" will never occur on a NACOL accumulator.

When oil flows out of the NACOL accumulator, the bladder expands. Because of its one piece pleated design, it holds its shape during decompression.



NACOL's unique cushion ring made of teflon, prevents the pleated bladder from being pinched by the poppet. This patented feature eliminates one of the major causes of accumulator failure.

# PRECLOSURE

“Preclosure” happens when an accumulator shuts itself off, trapping oil inside the accumulator, resulting in decreased oil volume out of the accumulator

## How “Preclosure” happens

As oil starts to discharge from the accumulator, there is a pressure drop across the poppet at the bottom of the accumulator. The flow results in a greater pressure on the top of the poppet. The higher pressure on top of the poppet combined with the oil flow around the poppet tends to slam the poppet shut before all of the oil has discharged from the accumulator. This is called “Preclosure”. The result is that much of the oil is trapped inside the accumulator.

The NACOL accumulator uses a much stronger poppet spring to hold the poppet open. So even though there is a pressure drop across the poppet, the spring holds the poppet open until all of the oil has been discharged from the accumulator. The net result is that you get full oil discharge from the NACOL accumulator.

## Competitor's design

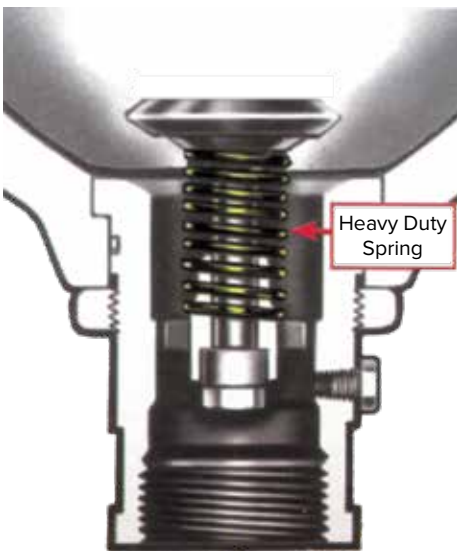


*Oil discharging from the accumulator causes a pressure drop at the poppet*

## NACOL's design



*As oil flows out of the NACOL accumulator, a strong spring prevents the poppet from closing*



*The NACOL oil port housing features a heavy duty spring to withstand hydraulic pressure.*



*The poppet closes, trapping oil in the accumulator*

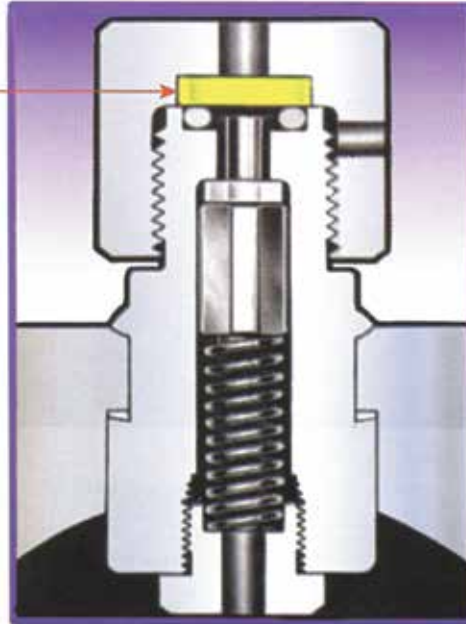


*When all of the oil has been discharged the bladder forces the poppet closed*

# FIRE FUSE

NACOL'S "Fire Fuse" prevents accumulator explosions in the event of fire or high heat, protecting your investment and your business

NACOL'S Patented Fire Fuse



A fire safety fuse, built into the NACOL charging valve, melts in case of fire and vents the accumulator gas charge.

The patented NACOL charging valve contains a fire fuse which melts to vent the nitrogen gas in case of a fire or extreme heat. Accumulator users always fear an accumulator explosion in case of fire because the gas pressure builds up as the temperature increases. If the nitrogen is not vented, the high pressure gas could cause an explosion.

Some of the latest code regulation state that all accumulators must have some form of fire protection. NACOL meets all fire safety standards.

Competitor's design

NACOL's design



*Trapped expanding Nitrogen gas, due to heat, can cause an explosion in an accumulator that has no fire safety protection*

# PLEATED BLADDER

Longitudinal pleats in the NACOL bladder cause it to compress “Star Shaped”, which gives you longer bladder life

## NACOL'S design

The NACOL Bladder is never subject to uncontrolled deformation and twisting during compression. The patented bladder compresses star shaped while in the center of the accumulator. The bladder does not rub the inside of the shell, and therefore has much longer life.



*Gas Charged*

*Natural Shape*

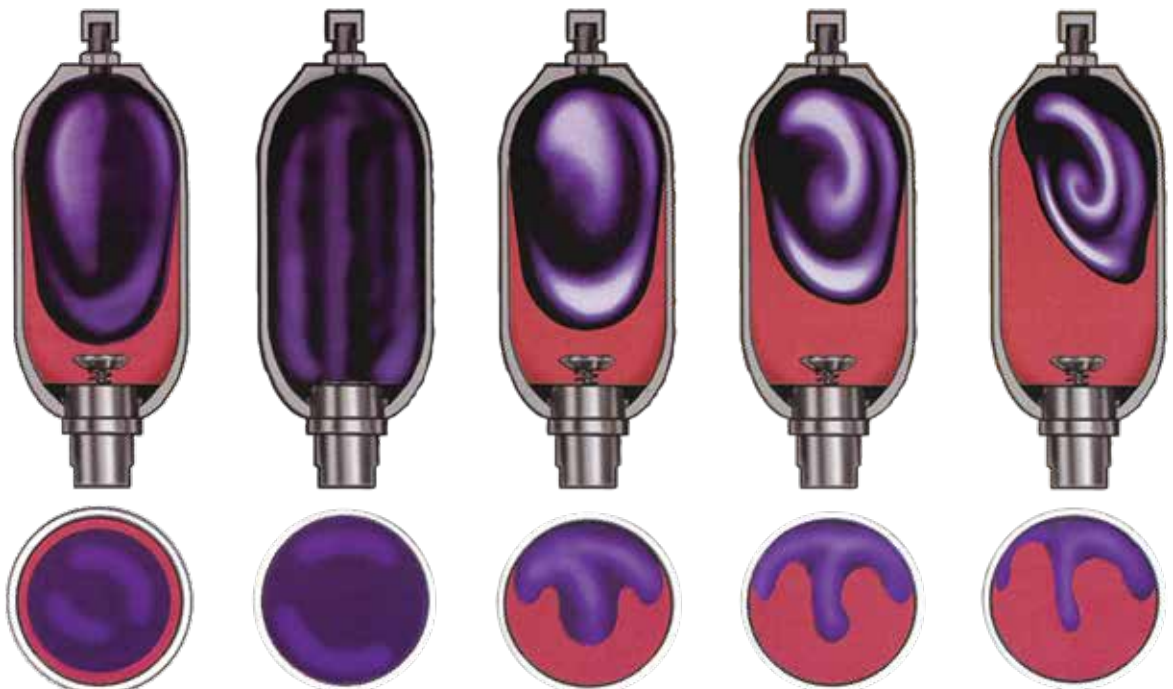
*1/2 Compression*

*1/3 Compression*

*1/4 Compression*

## Competitor's design

The bladder in conventional accumulators is subject to uncontrolled twisting and turning while it is being compressed toward the top of the accumulator. The twisting and turning can cause the bladder seams to rupture. The bladder also rubs on the inside of the accumulator during compression, thus causing bladder wear.



*Natural Shape*

*Gas Charged*

*1/2 Compression*

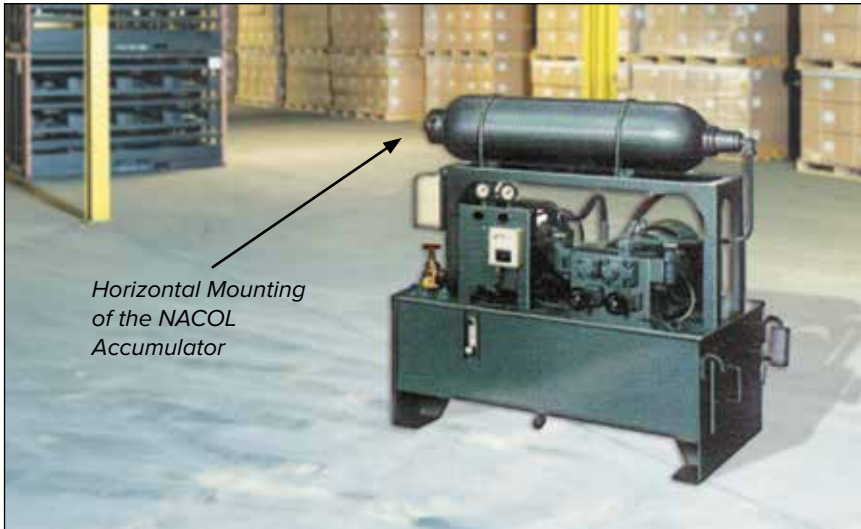
*1/3 Compression*

*1/4 Compression*



# HORIZONTAL MOUNTING

**Most accumulators are mounted vertically. Here is why you can mount NACOL horizontally**



When mounted horizontally, the conventional accumulator bladder elongates and falls to the bottom of the accumulator. During discharge the distorted bladder rubs against the bottom of the shell.

The picture to the middle left, is of the inside of a competitor's accumulator shell. The rough spots that are evident will cause excessive bladder wear, especially if the accumulator is mounted horizontally.

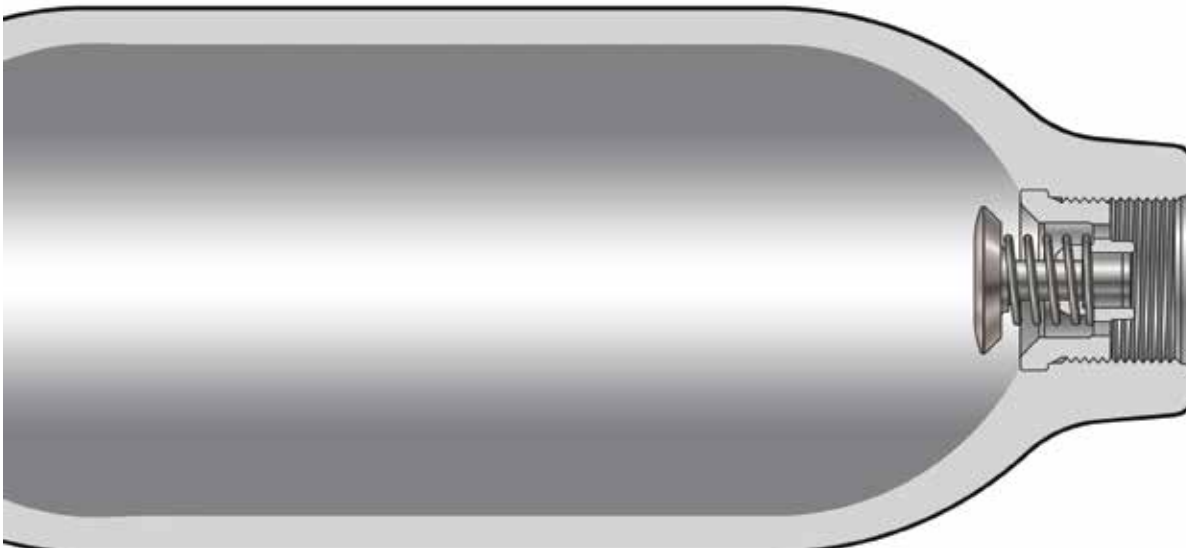
The interior shell of the NACOL accumulator is ground, heat treated, shot blasted and then coated with a white acrylic resin for a smooth surface. The picture at the bottom is of the interior of the NACOL accumulator. This smooth acrylic coating is standard on all NACOL accumulators 1 ½ gallons and larger. Less friction increases bladder life, under all operating condition especially when the accumulator is mounted horizontally.

Competitor's design



The strong poppet spring also plays an important role in the ability of the NACOL accumulator to operate when mounted horizontal.

NACOL's design



Accumulators are usually mounted horizontally because of space limitations. Other times it is just more economical to mount the accumulator horizontal. NACOL's design features mentioned above make it the obvious choice when horizontal mounting is necessary.

# BLADDER FAILURE

Many bladders fail at the seams. That is why NACOL makes a seamless bladder

Most large accumulator bladders are made of three or four pieces that are vulcanized together. Often pin hole leaks develop at the seams, causing loss of the entire nitrogen charge. The entire bladder can even separate at these seams. Most accumulator users are familiar with this type of failure.

The NACOL bladder is moulded in one piece to prevent seam leakage and bladder failure at the seams. In some sizes the very bottom of the bladder is moulded as a second piece in order to make the bottom much thicker. By moulding the bladder from one piece of rubber, instead of multiple pieces, NACOL has eliminated a major cause of accumulator failure.

Competitor's design

NACOL's design



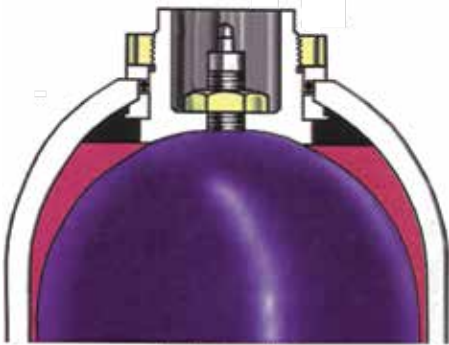
*Bladders made of three or four pieces that are vulcanized together have seams. The seams wear easily and can lead to accumulator failure*

*NACOL's bladder is moulded in one piece. One piece construction withstands pressure better, increasing bladder life and decreasing accumulator failure*

# ACCUMULATOR SPECIFICATIONS

Specifying “Top Loading” can cause maintenance problems, because not all “Top Loading” accumulators are equal

## Typical Competitors Design



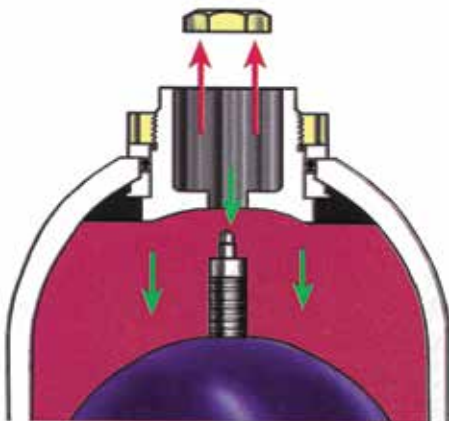
At the top of the accumulator there are two nuts

## NACOL's Design

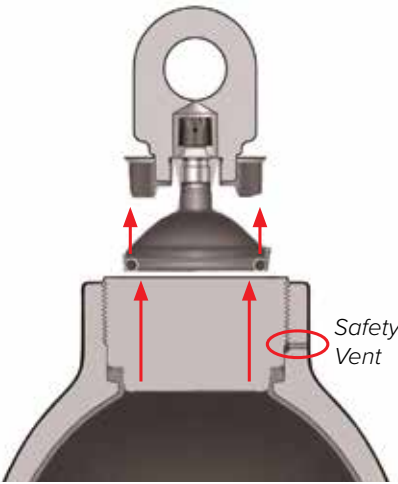


The NACOL accumulator top is held in place by one nut

The basic idea behind the design of the top loading accumulators that the bladder can be replaced without removing the accumulator from the hydraulic line. That saves maintenance time. However many accumulator users have discovered that some top loading accumulators actually cause additional maintenance time because the bladder and the top parts fall into the accumulator during repair time. Once the parts fall into the accumulator the unit must be removed from the hydraulic line in order to retrieve the parts.



Remove one nut and the bladder falls into the accumulator

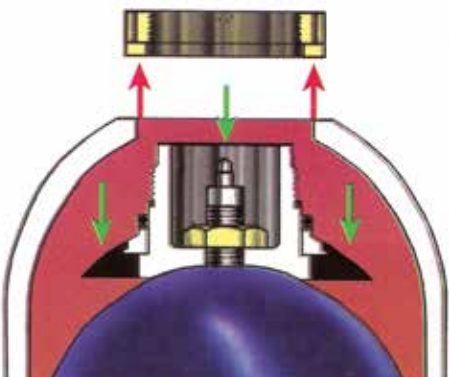


The nut and top cover are larger than the opening, so it is impossible for them to fall into the accumulator

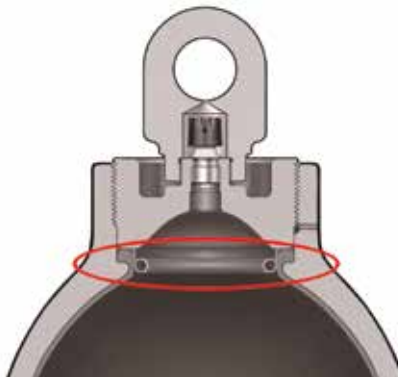
The bladder in the NACOL sits on a large shoulder that makes it impossible for it to fall into the accumulator once the top is removed.

Another important feature of the NACOL accumulator top assembly is the “Safety Vent”. The “Safety Vent” will vent any remaining nitrogen precharge as the top nut is loosened.

The more you know about internal accumulator design the more reasons you have to specify NACOL.



Or, remove the second nut and the entire assembly falls into the accumulator



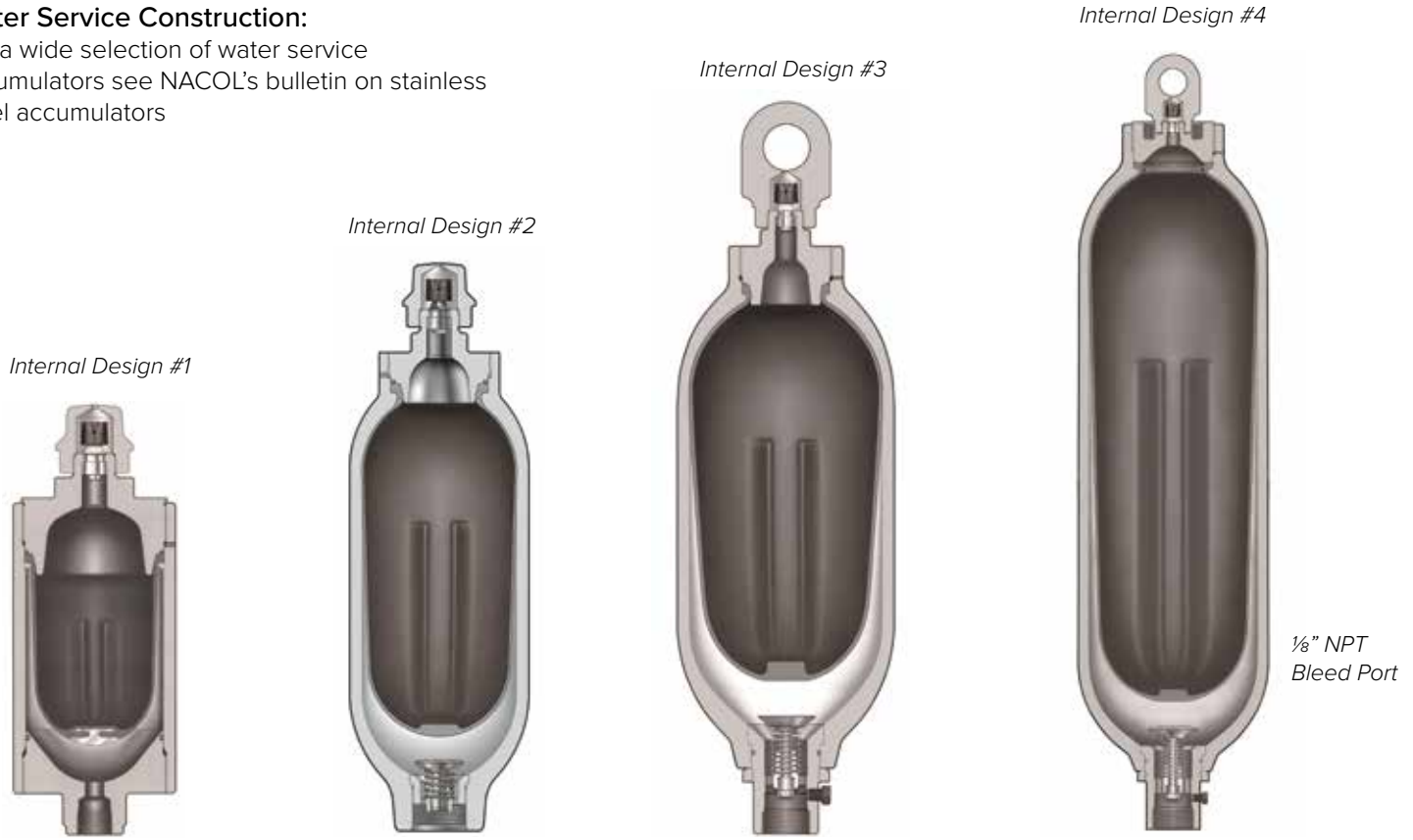
The bladder is held in place by a shoulder that keeps it from falling once the top is removed

# 3000 P.S.I. ACCUMULATORS

1/5 Pint to 40 Gallons

## Water Service Construction:

For a wide selection of water service accumulators see NACOL's bulletin on stainless steel accumulators



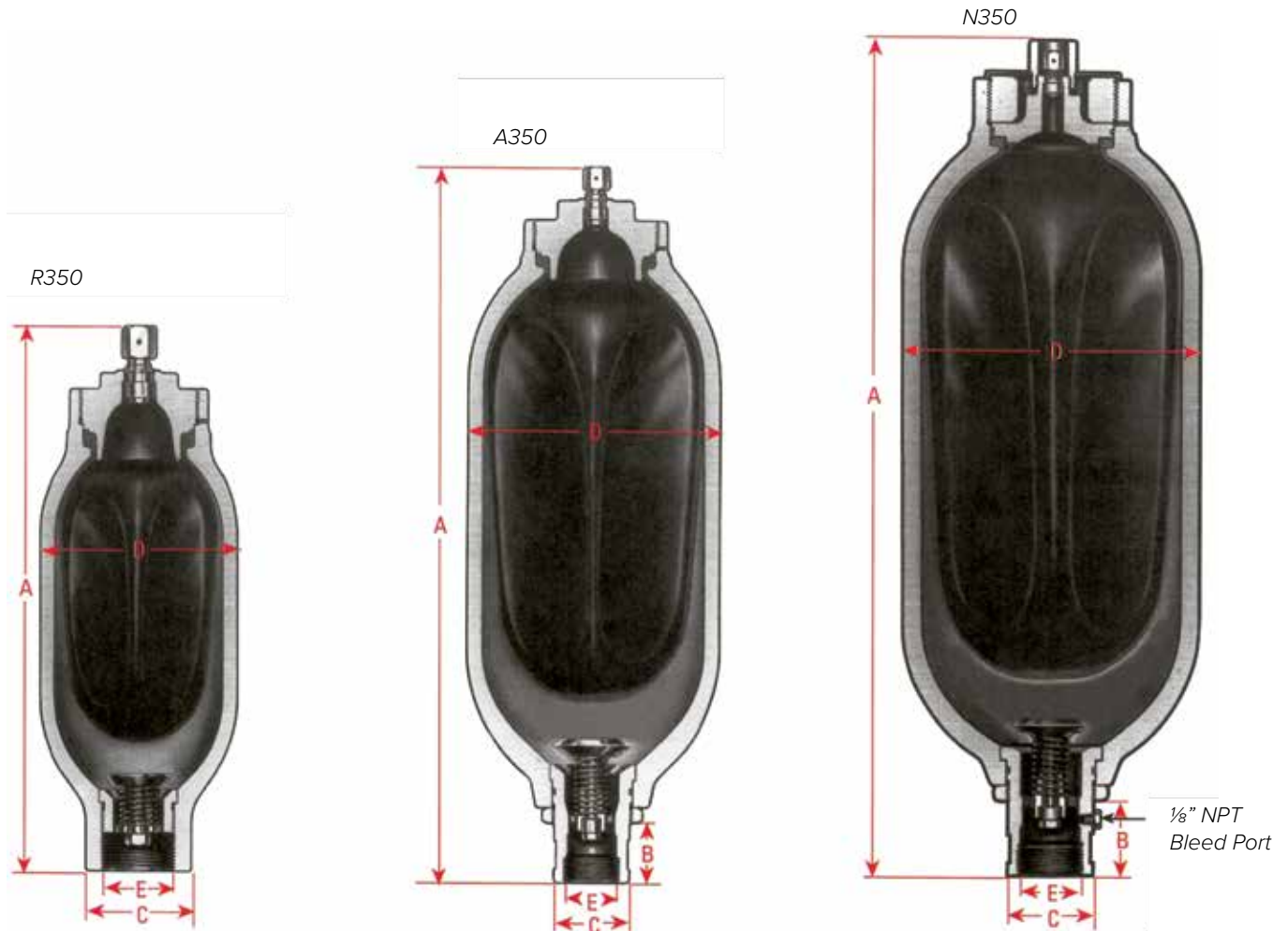
Internal Design #	Nominal Size	Model Number	Actual Size Gallons	Actual Size Cu. In.	Weight Lbs.	DIMENSIONS - Inches						Max. Flow* GPM In/Out
						A	B	C	D	X	X ALT.**	
1	1/5 Pint	J250-01D	0.02	4.9	4.4	5.67		1.26	2.84	3/8" NPT	1 1/16-12	5
	1 Pint	J250-05D	0.12	28	12	9.25		1.73	3.80	3/4" NPT	1 5/8-12	11
2	1 Quart	R230-1D	0.28	64	15	11.81		2.40	4.50	1 1/4" NPT	1 5/8-12	32
	1/2 Gal.	R210-2.5D	0.71	163	29	17.24		2.40	5.51	1 1/4" NPT	1 5/8-12	32
	1 Gal.	R210-4D	1.08	250	37	22.87		2.40	5.51	1 1/4" NPT	1 5/8-12	32
3	1 1/2 Gal.	A230-6.3D	1.74	402	66	25.47		2.25	7.51	1 1/4" NPT	1 5/8-12	79
	2 1/2 Gal.	A230-10D	2.67	616	86	32.36	1.89	2.25	7.51	1 1/4" NPT	1 5/8-12	79
	4 Gal.	A230-16D	4.39	1013	123	44.65	1.89	2.25	7.51	1 1/4" NPT	1 5/8-12	79
4	5 Gal.	N230-20A	5.68	1312	187	33.54	1.89	3.03	10.54	2" NPT	1 7/8-12	159
	7 1/2 Gal.	N230-30A	7.27	1678	246	43.19	2.76	3.03	10.54	2" NPT	1 7/8-12	159
	10 Gal.	N230-40A	9.54	2227	308	52.59	2.76	3.03	10.54	2" NPT	1 7/8-12	159
	12 1/2 Gal.	N230-50A	12.97	2996	396	64.33	2.76	3.03	10.54	2" NPT	1 7/8-12	159
	15 Gal.	N230-60A	14.32	3307	419	71.69	2.76	3.03	10.54	2" NPT	1 7/8-12	159
	30 Gal.	N230-120A	28.51	6584	794	78.46	3.27	3.64	14.01	2 1/2" NPT	N.A.	238
	40 Gal.	N230-160A	40.24	9294	1080	82.20	4.06	4.37	16.01	3" NPT	N.A.	317

\* Max. flow based on vertical installation.

\*\* X alternate port S.A.E. O-Ring type

# 5000 P.S.I. ACCUMULATORS

1 Quart to 15 Gallons



P.S.I.	Nominal Size	Model Number	Actual Size Gallons	Actual Size Cu. In.	Weight Lbs.	DIMENSIONS - Inches					Max. Flow* GPM In/Out
						A	B	C	D	E	
5000	1 Quart	R350-1D	0.28	67	26	13.04		2.60	5.00	1 5/8-12	32
5000	1/2 Gal.	R350-2.5D	0.69	159	44	17.21		2.60	6.00	1 5/8-12	32
5000	1 Gal.	R350-4D	1.11	256	66	22.85		2.60	6.00	1 5/8-12	32
5000	1 1/2 Gal.	A350-6.3D	1.82	421	88	22.77	2.25	2.25	8.52	M42x2 metric**	75
5000	2 1/2 Gal.	A350-10D	2.85	659	110	29.47	2.25	2.25	8.52	M42x2 metric**	75
5000	5 Gal.	N350-20D	5.36	1239	298	31.59	3.15	3.03	11.76	M60x2 metric**	159
5000	7 1/2 Gal.	N350-30D	8.03	1855	408	41.25	3.15	3.03	11.76	M60x2 metric**	159
5000	10 Gal.	N350-40D	10.49	2423	507	49.72	3.15	3.03	11.76	M60x2 metric**	159
5000	12 1/2 Gal.	N350-50D	14.03	3241	661	62.40	3.15	3.03	11.76	M60x2 metric**	159
5000	15 Gal.	N350-60D	15.67	3619	717	67.84	3.15	3.03	11.76	M60x2 metric**	159

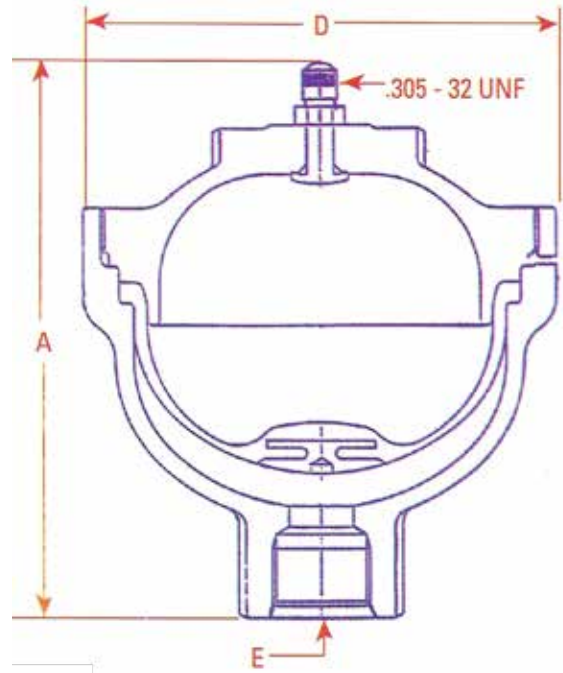
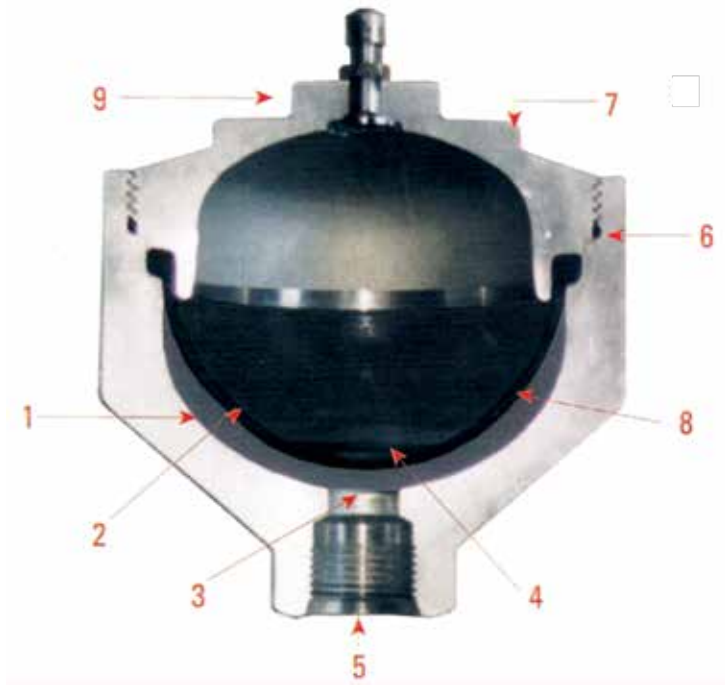
\*Max. flow based on vertical installation

\*\*Bushing to SAE port available upon request

# 400 P.S.I. ACCUMULATORS

## 1 Pint, 1 Quart

Low pressure, aluminum body accumulators at a low “throw away” price.



**Quality features include:**

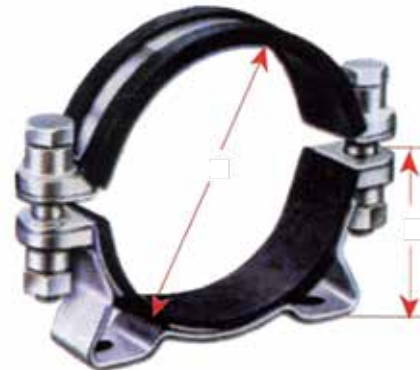
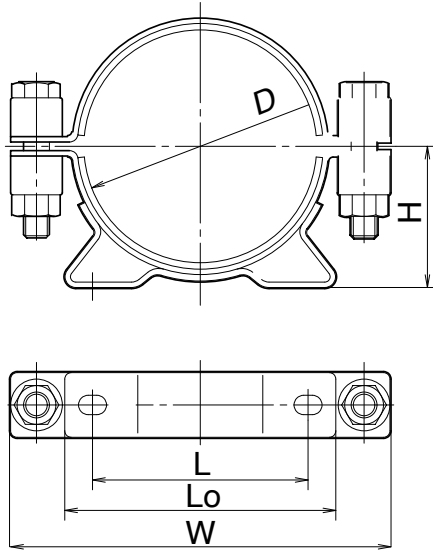
1. Cold drawn aluminum body gives a smooth surface for bladder contact.
2. Heavy duty, thick bladder to lessen nitrogen permeability.
3. Diaphragm type design gives maximum displacement with very little bladder flex.
4. Poppet moulded in bladder prevents bladder extrusion at both bottom and top.
5. Straight thread oil port.
6. O-ring seal prevents nitrogen leakage.
7. Safety vent automatically vents nitrogen during disassembly.
8. One-piece moulded bladder to prevent bladder seam problems.

- Immediate delivery on any quantity in all sizes.
- Priced as a “throw away” accumulator.
- Light weight, no supports required.
- Standard bladder has a wide temperature range for outdoor applications.

**400 P .S.I. Accumulators: 1 Pint, 1 Quart**

Nominal Size	Model Number	Actual Size Cu. In.	Weight Lbs	Dimensions			Max. Flow GPM In/Out
				A	D	E	
1 Pint	D30-05	26.54	4.0	5.98	5.11	1 1/16-12	18
1 Quart	D30-1	60	6.0	22.85	5.11	1 1/16-12	18

# MOUNTING CLAMPS



Accumulator Size	Accumulator Pressure	Accumulator Model #	Clamp #	DIMENSIONS					# Clamps per Acc.
				D	H	L	Lo	W	
1 Quart	3000 P.S.I.	R230-1D	C114	4.49	2.60	3.94	5.24	7.01	1
1 Quart	3000 P.S.I.	R350-1D	C128	5.04	2.83	5.35	6.18	7.64	1
½ Quart & 1 Gal.	3000 P.S.I.	R210-1D-2.5 to R210-4	C140	5.51	3.07	5.35	6.34	7.80	1
½ Quart & 1 Gal.	3000 P.S.I.	R350-2.5 to R350-4	C152	5.98	3.31	5.83	7.09	8.43	1
1 ½ Quart & 4 Gal.	3000 P.S.I.	A230-6.3, -10, -16	C191	7.52	4.09	5.83	7.28	9.88	2
5 Gal. & 15 Gal.	3000 P.S.I.	N230-20 to N230-60	C267	10.51	5.59	9.76	11.56	12.91	2
30 Gallon	3000 P.S.I.	N230-120	C350	13.78	7.08	13.58	14.96	16.14	3
40 Gallon	3000 P.S.I.	N230-160	C406	15.98	8.30	15.12	18.03	18.43	3

## Accumulator model number & how to order

### Bladder Material

**F**

For Petroleum Based Hydraulic Fluid:

Prefix	Bladder Material	Operating Temp.
None (std.)	Buna N (std.)	0° to 158°F
H	High Temp. Buna N	0° to 230°F
L	Low Temp. Buna N	- 40° to +158°F

For Synthetic or Phosphate Ester Fluid:

Prefix	Bladder Material	Operating Temp.
F	Butyl	0° to 158°F
E	Ethylene Propylene	0° to 158°

If a special bladder material is required the letter indicating that material would be specified before the prefix.

### Prefix

**H**

Prefix

D 30	=	400 P.S.I.
A 230	=	3300 P.S.I.
H 230	=	3000 P.S.I.
R 230	=	3300 P.S.I.
J 250	=	3500 P.S.I.
A 350	=	5000 P.S.I.
N 350	=	5000 P.S.I.
R350	=	5000 P.S.I.

The prefix indicates the type of accumulator.

### Pressure Rating

**230**

Pressure Rating

The pressure ratings is stated in kg/cm<sup>2</sup>. The conversion to P.S.I. is shown above.

### Size

**60**

Sizes

01	=	½ pt.
05	=	1 pt.
1	=	1 pt.
2.5	=	½ gal.
4	=	1 gal.
6.3	=	1½ gal.
10	=	2½ gal.
20	=	5 gal.
30	=	7½ gal.
40	=	10 gal.
50	=	12½ gal.
60	=	15 gal.
120	=	30 gal.
160	=	40 gal.

The model number gives the accumulator size in liters. The conversion to gallons is shown above and also in the accumulator dimensional tables.

### Oil Port Thread

**A**

Oil Port Thread  
A = N.P.T port  
AX = S.A.E straight thread port

Metric ports are available.

The last letters A or AX indicate the thread in the oil port.

# NITROGEN CHARGING VALVES, HOSE & GAUGE

The NV3 valve and the H10 hose are used for the 3000 P.S.I. accumulators. The NV5 and H50 hose are used for the 5000 P.S.I. accumulators.

The SV1 and the H10 hose are used for the low pressure D30 accumulators and they are also used to charge the 3000 P.S.I. accumulators when the 305-32 UNF type charging valve option is specified.

## Pressure Gauge

Model G2.5  
(3000 PSI Accumulators)  
Model G5.0  
(5000 PSI Accumulators)



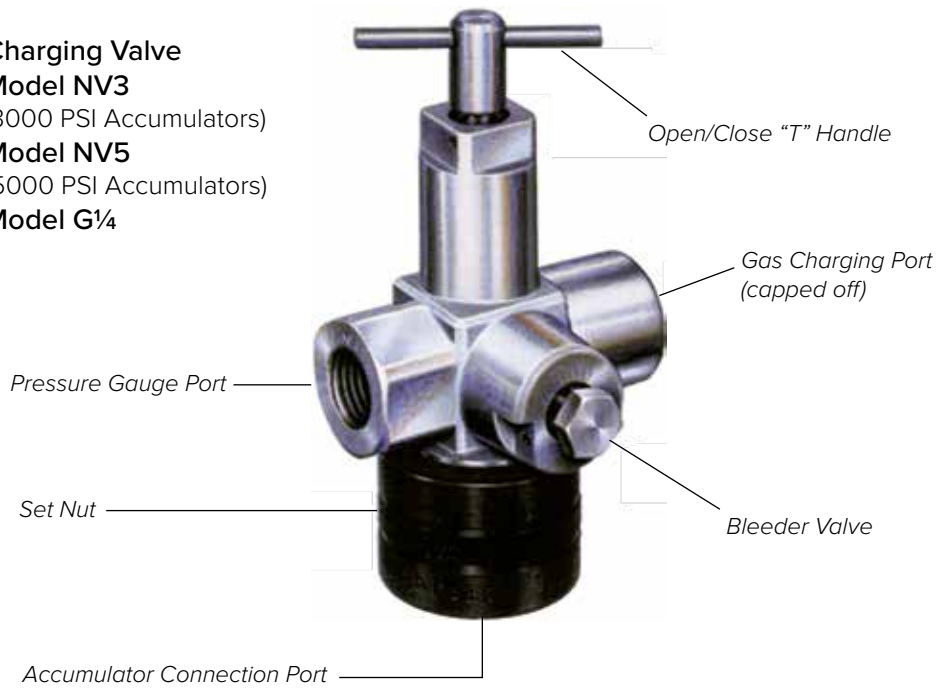
## Charging Hose

Model H10  
(3000 PSI Accumulators)  
Model H50  
(5000 PSI Accumulators)



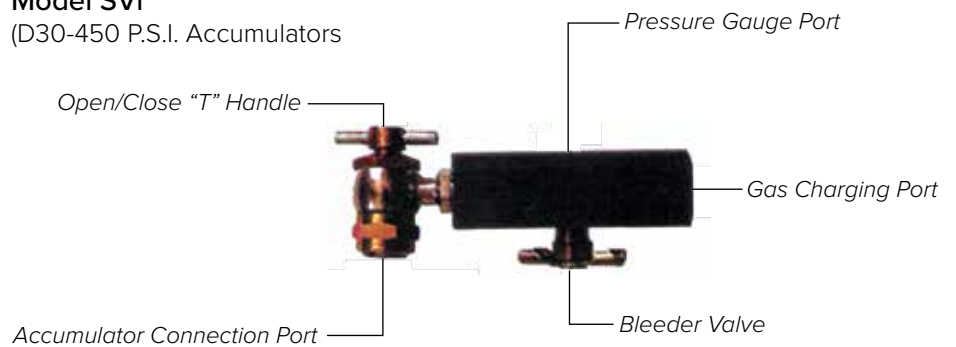
## Charging Valve

Model NV3  
(3000 PSI Accumulators)  
Model NV5  
(5000 PSI Accumulators)  
Model G1/4



## Charging Valve

Model SV1  
(D30-450 P.S.I. Accumulators)



## Charging Valve Specifications

Charging Valve Model Number	NV3	NV5	NV3-G 1/4	SV1
Pressure Rating of Accumulator	3000 P.S.I.	5000 P.S.I.	350 kg/cm	450 P.S.I.
Accumulator Model Series	J250 R210	R350 A350 N350	A230 N230 J50 to J250	D30
Charging Valve Thd. on top of Acc.	1/2-20 UNF	G3/8 ISO	G1/4	.305-32 UNEF
Gauge Port	1/4" N.P.T.	1/4" N.P.T.	1/4" N.P.T.	1/4" N.P.T.
Gas Charging Port in Valve	1/4" N.P.T.	1/4" N.P.T.	1/4" N.P.T.	1/4" N.P.T.
Model Number of Charging Hose	H-10	H-50	H-10	H-10
Nitrogen Bottle Connection on Hose	CGA-580	CGA-680	W22	CGA-580



# CHARGING AN ACCUMULATOR

## Nitrogen pre-charge pressure

The usual nitrogen pre-charge pressure is 80% of the minimum circuit pressure. As the nitrogen pre-charge percentage increases, more volume will be displaced from the accumulator. It should not be increased above 90% on vertical installations or 85% on horizontal installations. If these recommendations are exceeded then the bladder life is reduced. Bladder damage can occur if nitrogen pre-charge pressure falls below 35% of the maximum working pressure.

## Caution!

Never turn the pump on without first precharging the accumulator. If the accumulator is pressurized with hydraulic pressure before it is pre-charged with nitrogen, the hydraulic pressure will extrude the bladder out of the hole in the top of the accumulator used for the nitrogen pre-charge.

## Charging an accumulator

The NV-3 G<sup>1</sup>/<sub>4</sub> valve and the H-10 hose are used for the 3000 P.S.I. accumulator. The NV-5 valve and the H-50 hose are used for the 5000 P.S.I. accumulator.

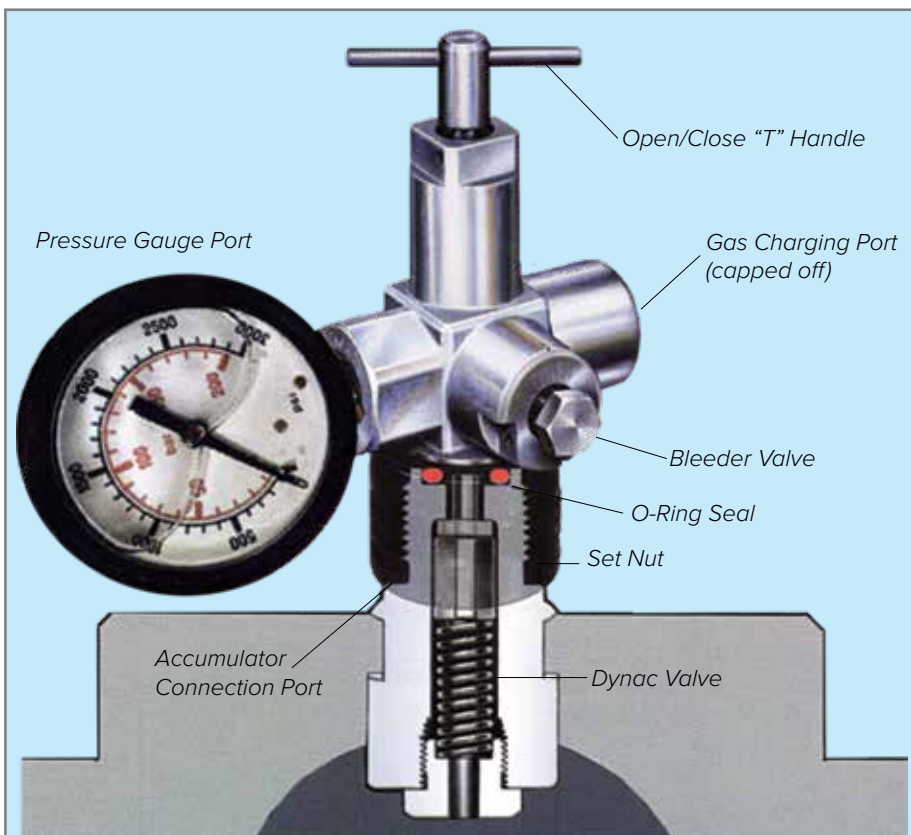
The NV-3 G<sup>1</sup>/<sub>4</sub> and the NV-5 charging valves thread onto the Dynac charging valve in the top of the accumulator. The connection can be made hand tight. Do not use a wrench. A leak proof seal is formed by the compression of the O-ring between the two valves.

The charging hose connects the charging valve to the nitrogen bottle. Turning the "T" handle at the top of the charging valve, pushes the poppet in the Dynac valve off of its seat and nitrogen can flow into the accumulator. The nitrogen charge is read on the gauge in the charging valve. After the accumulator is charged reverse the "T" handle to allow the Dynac valve to close.

Now close the shut off valve on the nitrogen bottle. The bleeder valve on the charging valve is now opened to exhaust the nitrogen trapped in the hose. The charging valve should now be removed from the accumulator. Do not leave the charging valve on the accumulator in attempt to constantly monitor the pressure because the charging valve is not intended to be a leakproof connection and this practice could result in a pre-charge loss.

## Checking the pre-charge.

When checking the pre-charge follow the procedure outlined above only be sure not to have the hose connected to the charging valve. The hose connection on the valve should be capped off. Needless filling the hose with nitrogen could reduce the precharge pressure.



## Charging Procedure

1. Connect hose to charging valve and nitrogen bottle.
2. Hand tighten charging valve to top of accumulator.
3. Open valve on top of nitrogen bottle.
4. Turn T-handle on top of charging valve clockwise to open Dynac valve in accumulator
5. Read nitrogen pressure on gauge.
6. Reverse T-handle when gauge reads desired pressure.
7. Wait several minutes for nitrogen pressure to stabilize, then repeat steps 4, 5 and 6.
8. After T-handle is completely reversed, close valve at the nitrogen bottle.
9. Vent pressure in hose by opening bleeder valve.
10. Remove charging valve and replace gas valve guard on Dynac valve.

# NACOL ACCUMULATOR SPARE PARTS

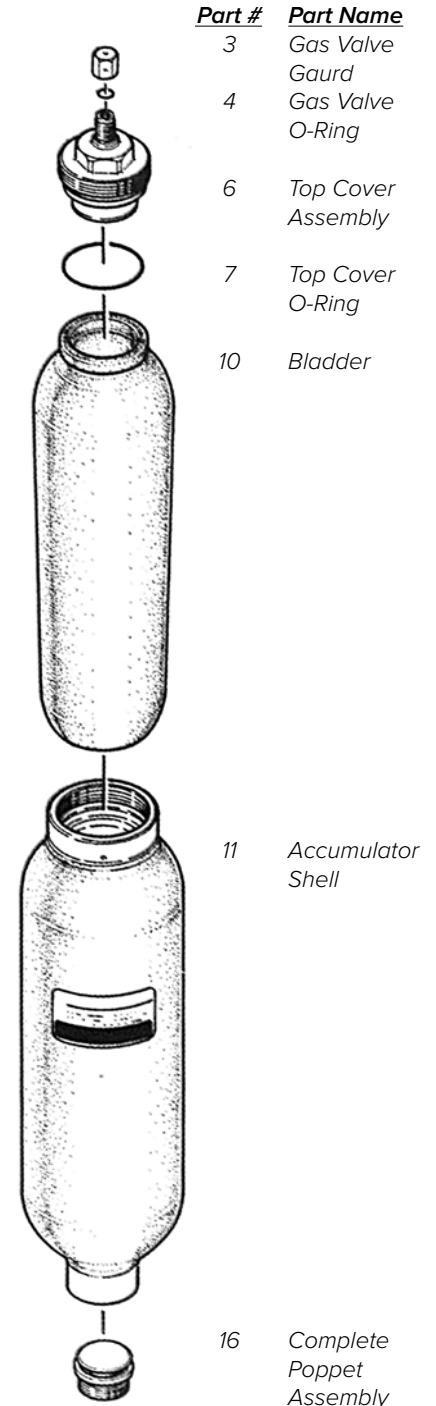
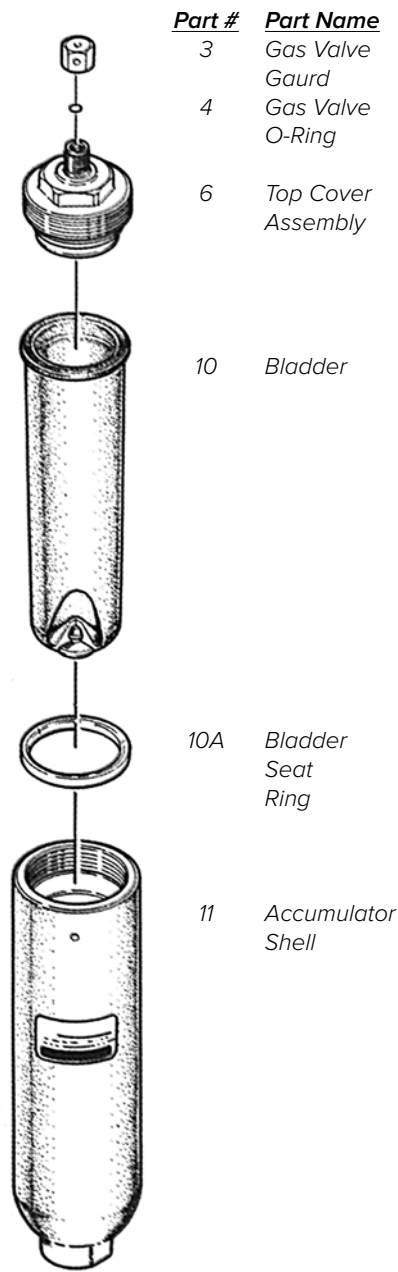
**TO ORDER:**

Specify model number, part number and name. For bladders also specify bladder material (see Pg 19)

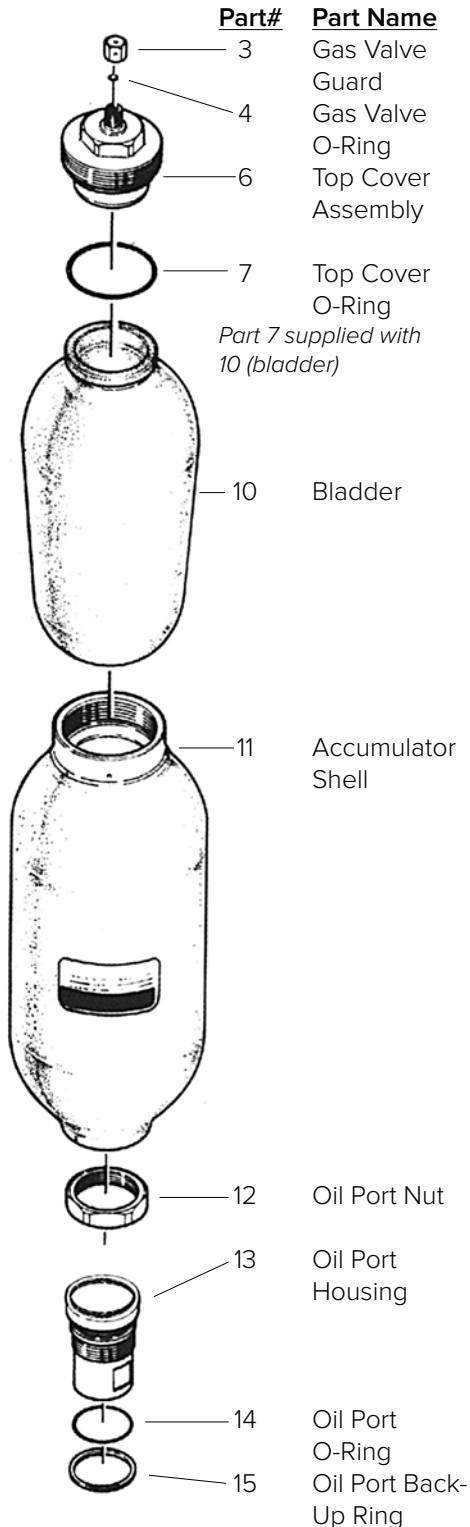
The model numbers to the right require a prefix and a suffix. The prefix specifies special bladder material required if other than standard. The suffix indicates oil port thread type. See page 15 for more information on the accumulator model number and how to order.

Model Number	Nominal Size
J250-01.....	1/8 Pint
J250-05.....	1 Pint

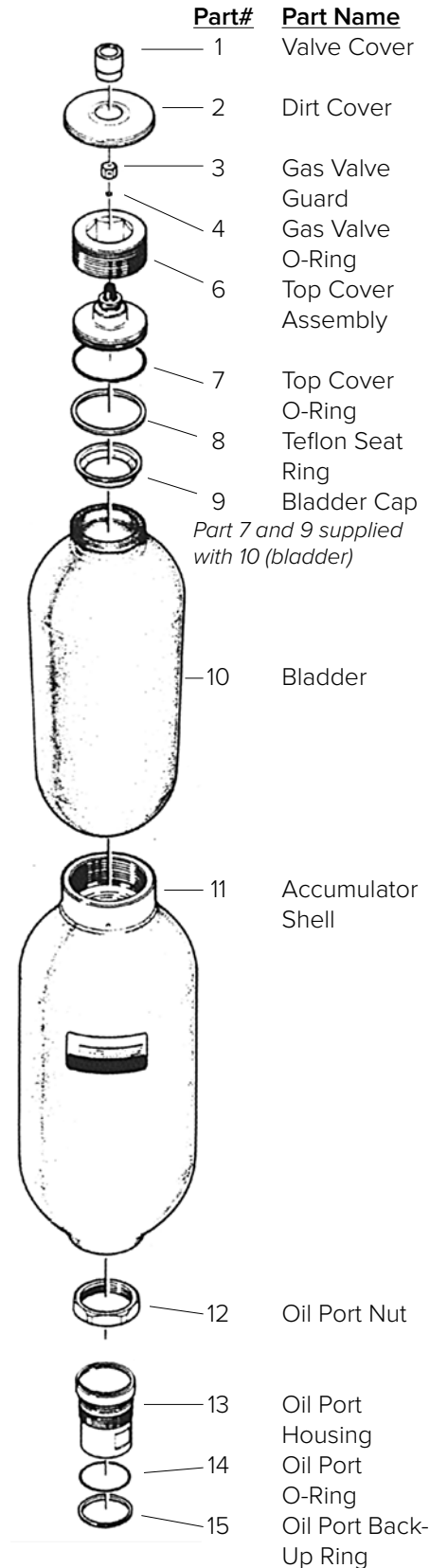
Model Number	Nominal Size
R230-1 or R350-1.....	1 Quart
R210-2.5 or R350-2.5.....	1/2 Gallon
R210-4 or R350-4.....	1 Gallon



Model Number	Nominal Size
R230-6.3 or R350-6.3	1½ Gallon
R230-10 or R350-10	2½ Gallon
R230-16	4 Gallon

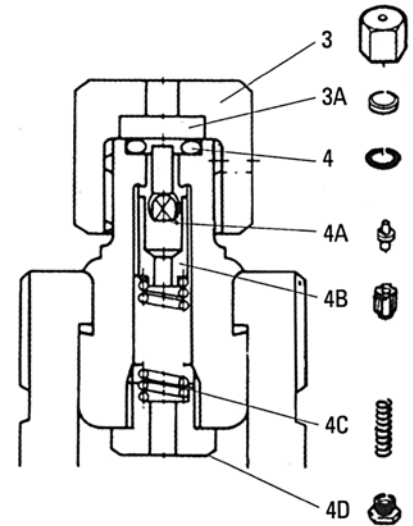


Model Number	Nominal Size
N230-20 or N350-20	5 Gallon
N230-30 or N350-30	7½ Gallon
N230-40 or N350-40	10 Gallon
N230-50 or N350-50	12½ Gallon
N230-60 or N350-60	5 Gallon
N230-120	30 Gallon
N230-160	40 Gallon



### Dynac Gas Valve Kit

For all accumulator models  
(Order Kit #20)



#### Dynac Gas Valve Parts

Part#	Part Name
3	Gas Valve Guard
3A	Fuse Packing
4	Gas Valve O-Ring
4A	Dynac Gas Valve
4B	Dynac Gas Valve Stem
4C	Dynac Gas Valve Spring
4D	Dynac Gas Valve Spring Nut

### Bladder Materials

For Petroleum Based Hydraulic Fluid:

Prefix	Bladder Material
None (std.)	Buna N (std.)
H	High Temp. Buna N
L	Low Temp. Buna N

For Synthetic or Phosphate Ester Fluid:

Prefix	Bladder Material
F	Butyl
E	Ethylene Propylene

Specify the letter indicating a special bladder material before the accumulator model number

### Oil Port Thread

Suffix	Thread Type
A	= N.P.T. Port
AX	= SAE. Straight Thread Port

Specify the letter indicating an oil port thread type after the accumulator model number

# PRODUCT SAFETY

*is a major concern when buying hydraulic accumulators*

Here is NACOL's formula for a safe accumulator

Unique Design that Stresses Product Safety



Made to Meet National and World-wide Safety Standards (see below)



Certified Quality Control (ISO 9001 Certification)



Recognized Worldwide as a Safe, Reliable Accumulator

- 82 Worldwide patents
- ISO 9001 Certification
- Manufactured to A.S.M.E. Code
- Meets European (EU) Standard
- Authorized by Japan M.I.T.I.

- Meets Chinese Standard
- Canada CRN, CSA Standard B51
- American Bureau of Shipping
- Can meet many other standards



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