

# Greer Bladder Accumulators

Critical energy management solutions  
for hydraulic system applications across  
the global nuclear industry

**Energy Steel** is the authorized manufacturer of Greer Bladder Accumulators for the global nuclear industry, including Safety Related, ASME Section III, and commercial grade.

**The Greer Bladder Accumulator is the nuclear industry's most reliable on the market today.**

#### PROVEN SOLUTION

For decades, bladder accumulators have proven to be a critically important energy management solution for many hydraulic system applications. They are suitable for storing energy under pressure, absorbing hydraulic shocks, and dampening pump pulsation and flow fluctuations. They provide excellent gas and fluid separation, which ensures dependable performance, maximum efficiency, and long service life.

#### CRITICAL BENEFITS

- ✓ Improves system efficiency
- ✓ Supplements pump flow
- ✓ Supplies power in an emergency
- ✓ Compensates for leakage
- ✓ Absorbs hydraulic shocks
- ✓ High/low temperature tolerance
- ✓ Safety: cannot be disassembled under pressure
- ✓ Rapid response
- ✓ Works well with water and low-lubricity fluids
- ✓ Wide range of compounds for a variety of fluids

**The nuclear industry's original and best bladder accumulators**

Improve the efficiency and reliability of your operations with a Greer Bladder Accumulator.



# Design Features

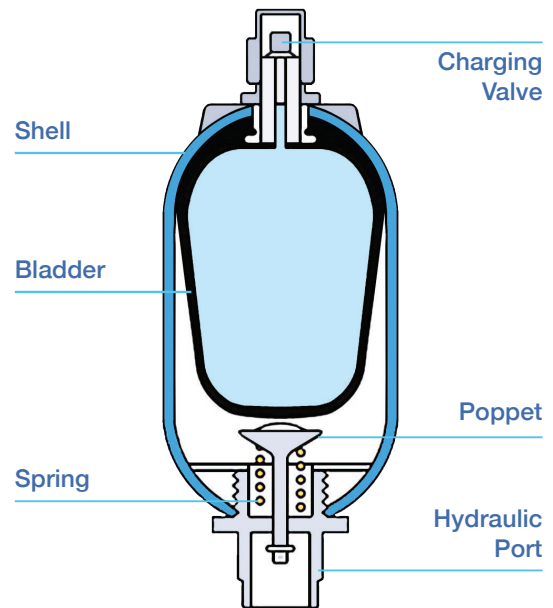
## OPTIMIZED FOR SAFETY & EFFICIENCY

The Greer Bladder Accumulator is consistently manufactured to the highest quality standard.

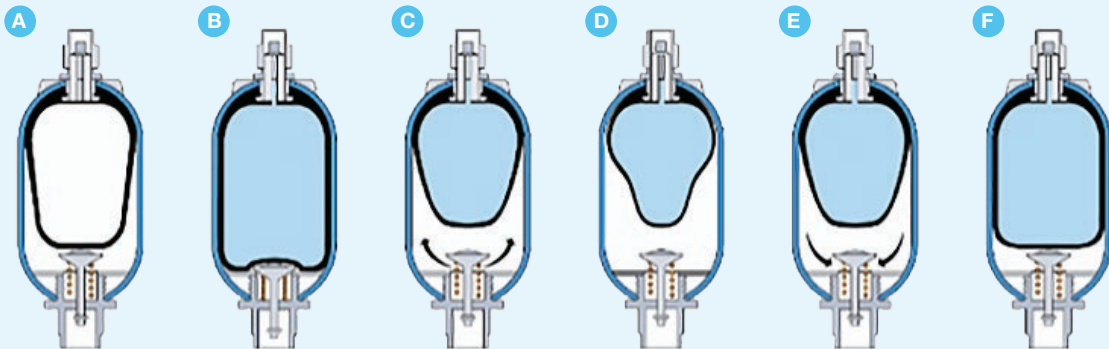
It features a non-pleated, flexible rubber bladder housed within a steel shell.

A steel gas valve is molded on the top of the bladder. A poppet valve, normally held open by spring force, prevents the bladder from extruding through the port when the bladder is fully expanded in the shell.

Greer bladder accumulators are available as either top or bottom repairable units for optimum flexibility.



## Operating Conditions of the Bladder



### Stage A

The accumulator is empty, and neither gas nor hydraulic sides are pressurized.

### Stage B

The accumulator is precharged.

### Stage C

The hydraulic system is pressurized. As system pressure exceeds gas, precharge hydraulic pressure fluid flows into the accumulator.

### Stage D

System pressure peaks. The accumulator is filled with liquid to its design capacity. Any further increase in hydraulic pressure is prevented by a relief valve in the hydraulic system.

### Stage E

System pressure falls. Precharge pressure forces fluid from the accumulator into the system.

### Stage F

Minimum system pressure is reached. The accumulator has discharged its design maximum volume of liquid back into the system.

## PULSE-TONE ACCUMULATOR

There have been many attempts to solve the problems caused by high transient flow conditions inherent with pulsations and shocks.

All attempts have had one thing in common: they never quite solved the problem. Then came Greer's Pulse-Tone concept, a patented breakthrough in pulsation control. The trouble with the previous devices was that most of the pulsations and shocks never got near the shock absorber.

Pulse-Tone puts a flow diversion baffle into the line. Fluid traveling through the hydraulic line bends around the baffle, but pulsation and shock energy waves take the path of least resistance right into the nitrogen precharged bladder. The bladder absorbs up to 98% of the waves' potentially destructive force.

### Specifications

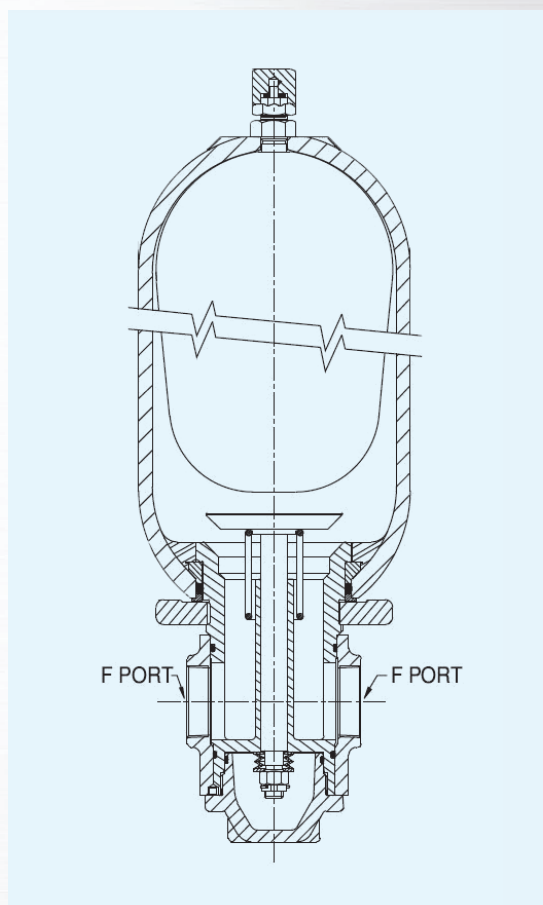
|                            |                    |
|----------------------------|--------------------|
| Maximum Operating Pressure | 3000 PSI (207 Bar) |
|----------------------------|--------------------|

#### MATERIALS

|                     |                                                                                                         |
|---------------------|---------------------------------------------------------------------------------------------------------|
| Shell               | High strength alloy steel, 1 gallon and up comply with all ASME material specifications as standard     |
| Ports               | All oil service ports, high strength alloy steel; water and chemical service, 3000 PSI; stainless steel |
| Poppet & Spring     | Stainless steel                                                                                         |
| Gas Valve Cartridge | Steel                                                                                                   |
| Gas Valve Protector | Steel                                                                                                   |
| Gas Valve Stern     | Steel                                                                                                   |
| Bladder             | Various polymers                                                                                        |

#### PULSE-TONE FLOW RATES

| Size<br>(cu in) | Max. Recommended Flow |     |
|-----------------|-----------------------|-----|
|                 | GPM                   | LPM |
| 1 gal.          | 38.0                  | 145 |
| 2.5 – 15 gal.   | 190.0                 | 720 |



### Why use Pulse-Tones?

- ✓ Improves system efficiency
- ✓ Absorbs hydraulic shocks
- ✓ Very contaminant-resistant
- ✓ Very quick response
- ✓ Works well with water, low lubricity fluids

# Replacements & Spare Parts

## PROVIDING RELIABLE AND TIMELY REPLACEMENT SUPPORT

Greer bladders are subject to high-quality inspection standards.

Should replacement become necessary, a full range of genuine Greer replacement bladder kits are available to bring your accumulator back to original condition.

All bladder kits include port O-ring, back up seals and gas valves with secondary seals.

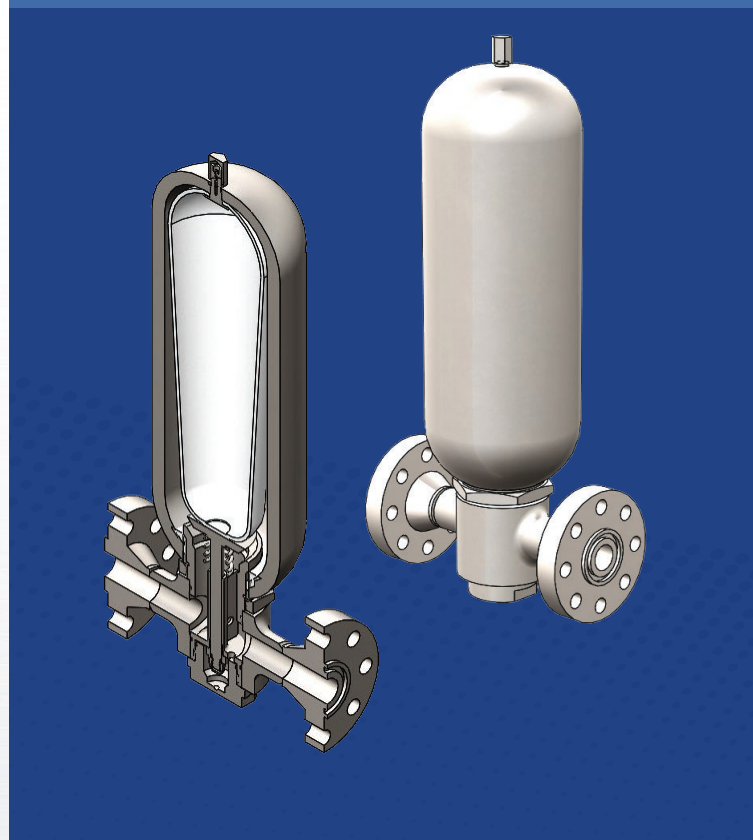
## LEAD TIMES

Our highly-efficient Quick Response Team enables us to offer extremely competitive lead times for bladder accumulators. Utilizing a proven streamlined process, we exceed customer expectations on both timing and flawless execution.

### Bladder Accumulator Applications

The bladder accumulator offers a reliable and efficient solution for:

- ✓ Water Hammer Arrestor
- ✓ Thermal Expansion
- ✓ Energy Storage
- ✓ Pulsation Dampening





## Rely on us when experience matters.

### INDUSTRY EXPERTISE

Greer bladder accumulators are associated with APV Gaulin and AJAX positive displacement pumps. As the approved supplier of both APV Gaulin and AJAX pumps in the nuclear industry, we have a deep understanding of both suction and discharge conditions, critical requirements of the accumulator system.

### CERTIFICATIONS

We hold the following quality standards:

- ✓ ASME Section III
- ✓ Certifications:  
N, NPT, NA, NR, NS, U, R
- ✓ NQA-1
- ✓ 10 CFR 50 Appendix B
- ✓ 10 CFR 50 Part 21

### QUALITY PROGRAM

Our Nuclear Quality Program is the backbone of what we do. Energy Steel has established a Quality Assurance Program that conforms to the ASME Boiler and Pressure Vessel Code Section III, Class 1, 2 & 3 within the scope of the N, NPT, NA, NS, and U Certificates. We offer repair and replacement services in accordance with NBIC within the scope of the R and NR Certificate of Authorization. This program is also established for the design, fabrication, and supply of Safety Related Non-ASME Section III products and services and supply of materials in accordance with NQA-1, 10 CFR 50 Appendix B, ANSI N45.2, and 10 CFR Part 21.

**Energy Steel has been serving the nuclear power industry since 1982 with equipment, fabrication, material supply, precision machining, engineering, and repair services.**

# Quick Response Services

## Immediate service to support your Greer Bladder Accumulator.

When your operation is faced with a challenge that demands a rapid response, you can rely on Energy Steel's **Quick Response Team**. We are uniquely designed to handle Greer Bladder Accumulators from quote to shipment with unparalleled turnaround times. Our cross-functional team relies on a proven, highly-efficient process that delivers what you need, when you need it.

### QUICK RESPONSE SERVICES

- ✓ Engineered Solutions
- ✓ Emergency Needs
- ✓ ASME Sec III Material Supply
- ✓ Contingency Planning
- ✓ Outage Support
- ✓ OEM Products
- ✓ Code Reconciliation



### Our Quick Response Team supports:

- ✓ Pumps & Valves
- ✓ Filters/Strainers
- ✓ Greer Bladder Accumulators
- ✓ Machined Components
- ✓ Non-Welded Assemblies
- ✓ Certified OEM Components
- ✓ Commercial Grade Dedication



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