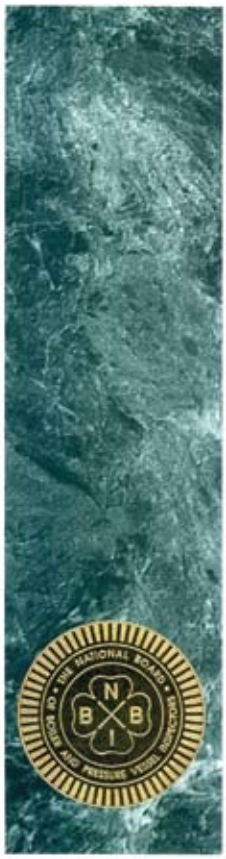
# Tobul
## Accumulator

**The pressure is always on.**


www.tobul.com



# THE NATIONAL BOARD
OF
BOILER & PRESSURE VESSEL INSPECTORS

## *Certificate of Authorization*

*This is to certify that*

**TOBUL ACCUMULATOR, INC.**
**186 ACCUMULATOR STREET**
**BAMBERG, SC 29003**

*is authorized to apply the "NB" mark and register boilers, pressure vessels, or other pressure retaining items with the National Board in accordance with its provisions.*
*The scope of Authorization is limited to items manufactured in accordance with:*

*ASME* *Stamp(s):* *U*

**ISSUE DATE:** **January 3, 2008**

**EXPIRATION DATE:** **January 3, 2011**

Executive Director

NB-137 Rev. 6

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The American Society of Mechanical Engineers

# CERTIFICATE OF AUTHORIZATION

This certificate accredits the named company as authorized to use the indicated symbol of the American Society of Mechanical Engineers (ASME) for the scope of activity shown below in accordance with the applicable rules of the ASME Boiler and Pressure Vessel Code. The use of the Code symbol and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any construction stamped with this symbol shall have been built strictly in accordance with the provisions of the ASME Boiler and Pressure Vessel Code.

COMPANY:

**Tobul Accumulator, Inc.**
**186 Accumulator Street**
**Bamberg, South Carolina 29003**

SCOPE:

**Manufacture of pressure vessels at the above location only (this authorization does not cover welding or brazing)**

AUTHORIZED: **December 13, 2007**
EXPIRES: **January 3, 2011**
CERTIFICATE NUMBER: **16,326**

Chairman of The Boiler
And Pressure Vessel Committee

Director, Accreditation and Certification

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DNV

# DET NORSKE VERITAS
# TYPE APPROVAL CERTIFICATE

**CERTIFICATE NO. D-2827**
This Certificate consists of 4 pages

*This is to certify that the*
**ACCUMULATOR**

*with type designation(s)*
**ACCUMULATOR ASSEMBLY**
Model No. 18.5A65-640-8083 (80 Gallon Capacity)

*Manufactured by*
**TOBUL ACCUMULATOR, INC.**
Bamberg, South Carolina - USA

*is found to comply with*
DNV's Offshore Standard DNV-OS-E101 "Drilling Plant", October 2000
*and Det Norske Veritas' understanding of the implementation and interpretation of:*
PSA's "Regulations relating to the design & outfitting of facilities etc. in the Petroleum Activities (the Facilities Regulations)", including Guidelines, 3rd September 2001, Last amended 22nd December 2005.
NMD's "Regulations 4th September 1987 No. 856 concerning construction of Mobile Offshore Units", Last amended 11th April 2003.

*Application*
See Section "C"

*Place and date*
Høvik, 2006-01-26
for DET NORSKE VERITAS

Alf Henry Aker
*Principal Engineer*

*Local Office*
DNV Houston

*This Certificate is valid until*
2010-01-31

Win-Win Maung Aung/Maggie Wang
*Mechanical Engineer*

**Notice: This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.**

DET NORSKE VERITAS AS VERITASVEIEN 1, 1322 HØVIK, NORWAY TEL: (+47) 67 57 99 00 FAX: (+47) 67 57 99 11
Form No.: 20.90e Issue: January 98 Page 1 of 4

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ABS

CERTIFICATE NUMBER: 07-HS216911-PDA
DATE: 29 January 2007

ABS TECHNICAL OFFICE
Houston DED - Stability, Safety and Systems

# CERTIFICATE OF
# Design Assessment

This is to Certify that a representative of this Bureau did, at the request of

**Tobul Accumulator, Inc.**

assess design plans and data for the below listed product. This assessment is a representation by the Bureau as to the degree of compliance the design exhibits with applicable sections of the Rules. This assessment does not waive unit certification or classification procedures required by ABS Rules for products to be installed in ABS classed vessels or facilities. This certificate, by itself, does not reflect that the product is Type Approved. The scope and limitations of this assessment are detailed on the pages attached to this certificate. It will remain valid as noted below or until the Rules or specifications used in the assessment are revised (whichever occurs first).

PRODUCT: Piston Accumulator
MODEL: 9A30-484-8299
ABS RULE: 2007 Steel Vessel Rules 1-1-4/7.7, 4-6-7/3.5.4, 2006 MODU 4-2-4/13.11; 2006 ABS Guide for Certification of Drilling Systems 5.11
OTHER STANDARD: 2004 ASME Section VIII Division 1 , Add. 2005.

AMERICAN BUREAU OF SHIPPING
Harold Hamilton
Engineering Type Approval Co-ordinator

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Tobul

# Table of Contents

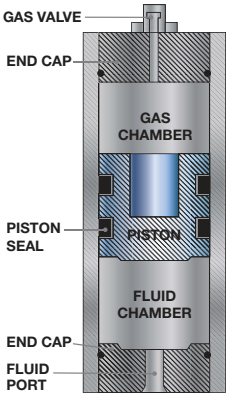
# Foreword

A hydraulic accumulator is a device in which potential energy is stored in the form of a compressed gas or spring, or by a raised weight to be used to exert a force against a relatively incompressible fluid.

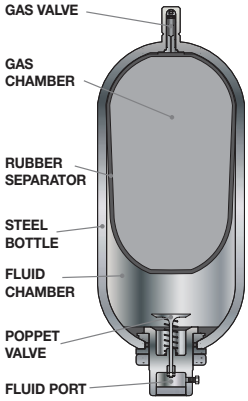
They are used in fluid power systems to accumulate energy and to smooth out pulsations. A hydraulic system utilizing an accumulator can use a smaller fluid pump since the accumulator stores energy from the pump during low demand periods. This energy is available for instantaneous use, released upon demand at a rate many times greater than could be supplied by the pump alone.

Accumulators can also act as surge or pulsation absorbers, much as an air dome is used on pulsating piston or rotary pumps. They will cushion hydraulic hammer, reducing shocks caused by rapid operation or sudden starting and stopping of power cylinders in a hydraulic circuit.

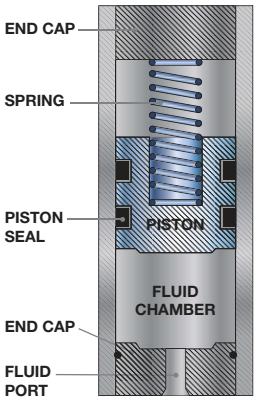
There are four principal types of accumulators, the weight loaded piston type, diaphragm (or bladder) type, spring type and the hydro-pneumatic piston type. The weight loaded type was the first used but is much larger and heavier for its capacity than modern piston and bladder types. Both the weighted type, and mechanical spring type are very seldom used today. The hydro-pneumatic types use a gas as a spring cushion in conjunction with a hydraulic fluid, the gas and fluid being separated by a thin diaphragm or a piston. Tobul accumulators, having an aluminum piston of low inertia as standard equipment, are superior to other makes in absorbing either high or low frequency pulsations.



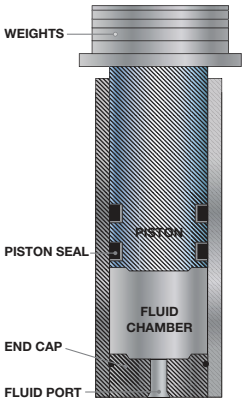

PISTON TYPE




BLADDER TYPE




SPRING TYPE




WEIGHT LOADED



# Functions

## Stores Energy.

Hydro-pneumatic accumulators incorporate a gas in conjunction with a hydraulic fluid. The fluid has little dynamic power storage qualities. The fluid normally used in fluid power applications can be reduced in volume only about 1.7% under a pressure of 5000 PSI. Therefore when only 2% of the total contained volume is released, the pressure of the remaining oil in the system will drop to zero. However, the relative incompressibility of a hydraulic fluid makes it ideal for fluid power systems and provides quick response to power demand.

The gas, on the other hand, a partner to the hydraulic fluid in the accumulator, can be compressed to high pressures and low volumes. Potential energy is stored in this compressed gas to be released upon demand. This energy can be compared to that of a raised pile driver ready to transfer its tremendous energy upon the pile. In the piston type accumulator the energy in the compressed gas exerts pressure against the piston separating the gas and hydraulic fluid. The piston in turn forces the fluid from the cylinder into the system and to the location where useful work will be accomplished.

## Absorbs Pulsations.

In most fluid power applications, pumps are used to generate the required power to be used or stored in a hydraulic system. Many pumps deliver this power in a pulsating flow. The piston pump, as commonly used for higher pressures, tends to produce pulsation detrimental to a high pressure system. An accumulator properly located in the system will substantially cushion these pressure variations.

## Cushions Operating Shock.

In many fluid power applications the driven member of the hydraulic system stops suddenly, creating a pressure wave which is sent back through the system. This shock wave can develop peak pressures several times greater than normal working pressures and can be the source of system failure or objectionable noise. The gas cushion in an accumulator, properly placed in the system, will minimize this shock. An example of this application is the absorption of shock caused by suddenly stopping the loading bucket on a hydraulic front end loader. Without an accumulator, the bucket, weighing over 2 tons, can completely lift the rear wheels of a loader off the ground. The severe shock to the tractor frame and axle, as well as operator wear and tear, is overcome by the addition of an adequate accumulator to the hydraulic system.

## Supplements Pump Delivery.

An accumulator, capable of storing power, can supplement the fluid pump in delivering power to the system. The pump stores potential energy in the accumulator during idle periods of the work cycle. The accumulator transfers this reserve power back to the system when the cycle requires emergency or peak power. This enables a system to utilize a much smaller pump, resulting in savings in cost and power.

## Maintains Pressure.

Pressure changes occur in a hydraulic system when the liquid is subjected to rising or falling temperatures. Also, there may be pressure drop due to leakage of hydraulic fluid. An accumulator compensates for such pressure changes by delivering or receiving a small amount of hydraulic liquid. In the event the main power source should fail or be stopped, the accumulator would act as an auxiliary power source, maintaining pressure in the system.

## Dispenses.

An accumulator may be used to dispense fluids under pressure, such as lubricating greases and oils.

**Tobul Accumulator, Inc.** is a well established, globally known, world-class manufacturer of hydraulic accumulators. Our designs have a proven track record of more than 45 years with the most comprehensive offering of piston-type accumulators in the industry.

Currently, we produce piston type accumulators from 2" to 24" in diameter with fluid capacities from 4 cubic inches to 300 gallons and operating pressures up to 20,000 PSIG. Tobul's ability to design and manufacture custom engineered hydraulic accumulators is unparalleled. Whether the accumulator is one of our standard models or custom designed, every accumulator produced is hydrostatically tested to 150% of its operating pressure. We are continually updating our manufacturing equipment to keep pace with the latest technologies.

Tobul products are shipped globally, with products in use in over 50 countries. We offer many different design certifications: ASME, National Board, DNV, CE, Coast Guard, ABS, Canadian Provincial Registry, Lloyd's, Australian, Chinese and others. Tobul Accumulator is constantly working to develop other globally recognized codes to have them available to meet our customers' diverse needs for our products.

Tobul Accumulator offers a wide range of different features and options. Following is a brief list:

- Wide variety of materials available for specialized applications – carbon steel of many grades, stainless steel, aluminum, titanium and many other exotic materials
- Severe duty designs for heavy use applications
- Unique 3-ring piston design as standard on several series
- Wide variety of seal materials and configurations available
- Nickel or chrome plating, and epoxy/anti-corrosive coatings
- Special flange or port connections
- Proximity switches, linear transducers, or mechanical indicating rods available for identifying piston location
- Safety pressure-relief devices available
- Special designs for OEM's on request



Additionally, Tobul Accumulator offers a competitive selection of bladder-type accumulators in most of the industry-standard capacities, with working pressures up to 7,500 PSIG.

Whether your choice is a standard model hydraulic accumulator, or a custom engineered special design, Tobul Accumulator, Inc. is ready to meet your needs with high quality products providing outstanding performance for your applications.


***Note:*** *Catalog contains standard production models; other pressure ratings, sizes and capacities are available upon request from Tobul Sales Engineering.*

National Fluid Power Association

THE FPDA
MOTION & CONTROL NETWORK
MEMBER



*Typical application of Gas Bottles and linear transducer-equipped Piston accumulators in an oil well control assembly – Courtesy of Control Automation PTE LTD."*

# Piston Accumulators

## An Overview

The variety and versatility of the piston-type design allows it to be utilized in over 90% of all potential applications. From a volume of a few cubic inches to hundreds of gallons, and up to 20,000 PSI MAWP, the piston-type hydro-pneumatic accumulator can meet the diverse needs of many industries with a standard or custom design.

Tobul has developed several distinct families of standard piston-type products, based on physical dimensions, MAWP (Maximum Allowable Working Pressure), and fluid volume. Each of the families is listed in this catalog and can be utilized as the basis for custom designs. Tobul piston-type product families are:

- **"ECONOLATOR®" Series**
- **3000 PSI MAWP Series**
- **5000 PSI MAWP Series**
- **10,000 PSI MAWP Series**
- **Custom Design Series including "Big Bore®" Series**

Tobul's ability to provide a variety of raw materials, (carbon steel, stainless steel, and various alloys) seal configurations and compounds, (Buna-N, EPR, Viton, Kalrez, Teflon, etc.) fluid and gas port configurations, and design characteristics to best meet the needs of the end customer makes them **"A Name for Excellence in Fluid Energy Control."**

***Note:*** *Catalog contains standard production models; other pressure ratings, sizes and capacities are available upon request from Tobul Sales Engineering.*

## The "Econolator®" Series...

### 2.2AL & 4.5AL (Non-Repairable)

#### The Econolator...

Tobul's permanently sealed accumulator specifically designed for systems with operating pressures up to 2500 PSI MAWP. It has been developed to meet requirements of the Original Equipment Manufacturer (OEM) market.

#### Dependable Construction...

Heavy duty steel cylinder and end caps are precision machine-welded for rugged durability. The hydraulically balanced aluminum piston, with a "T" ring seal and Teflon bearing, is precisely fitted into a "mirror-finished" cylinder.

#### Efficient Operation...

The long operating life design of the Tobul ECONOLATOR® includes such outstanding features as:

- Lightweight, low inertia aluminum piston
- Low friction "T" ring offering a positive seal which cannot roll or twist while in operation
- Pressure actuated Back-up rings which prevent seal extrusion and provide internal surface wiping
- Teflon guide ring providing low friction bearing and additional internal wiping action

#### Wide Range Of Applications...

Some typical uses are for shock absorbers, pressure storage units, and pulsation dampeners. The ECONOLATOR® is ideal for lift trucks, "cherry pickers" and other mobile equipment, as well as machine tools, presses, circuit breakers, injection molding machines, starters for diesel engines, power units, etc. It is ideally suited to the OEM market.

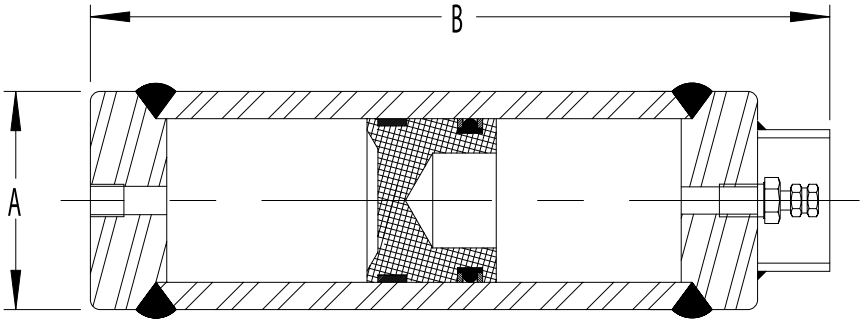
# Econolator®

## 2.2AL Econolator

### Accumulators 2,500 PSI (172 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 2.2AL-.5 | 16 | 257 | 0.0625 | 0.24 | 3 | 1 | 2.375 | 60 | 8.75 | 222 |
| 2.2AL-1 | 31 | 501 | 0.125 | 0.5 | 4 | 2 | 2.375 | 60 | 13.5 | 343 |
| 2.2AL-2 | 61 | 991 | 0.25 | 1 | 7 | 3 | 2.375 | 60 | 23 | 584 |

**Non-Repairable**




**GENERAL DESIGN DATA**

Maximum Working Pressure 2,500 PSI (172 Bar)
Maximum Proof Pressure 3,750 PSI (259 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE-8
(Note: Optional fluid port sizes and styles available)
Replacement Gas Valve Pt. # 2523

Standard seal material for petroleum base oil.
Seals available for other fluids.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

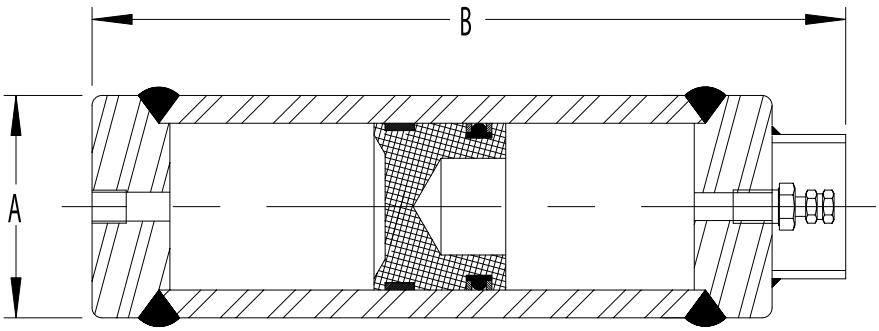


## 4.5AL Econolator

### Accumulators 2,500 PSI (172 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 4.5AL-2 | 74 | 1,213 | 0.25 | 1 | 15 | 7 | 4.625 | 118 | 9.875 | 251 |
| 4.5AL-4 | 132 | 2,163 | 0.5 | 2 | 18 | 8 | 4.625 | 118 | 14.25 | 362 |
| 4.5AL-8 | 249 | 4,080 | 1 | 4 | 23 | 10 | 4.625 | 118 | 23 | 584 |
| 4.5AL-12 | 364 | 5,965 | 1.5 | 6 | 30 | 14 | 4.625 | 118 | 31.75 | 806 |
| 4.5AL-16 | 480 | 7,866 | 2 | 8 | 36 | 16 | 4.625 | 118 | 40.5 | 1,029 |
| 4.5AL-20 | 595 | 9,750 | 2.5 | 10 | 42 | 19 | 4.625 | 118 | 49.25 | 1,251 |
| 4.5AL-24 | 710 | 11,634 | 3 | 12 | 48 | 22 | 4.625 | 118 | 58 | 1,473 |

**Non-Repairable**




**GENERAL DESIGN DATA**

Maximum Working Pressure 2,500 PSI (172 Bar)
Maximum Proof Pressure 3,750 PSI (259 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE-16
(Note: Optional fluid port sizes and styles available)
Replacement Gas Valve Pt. # 2523

Standard seal material for petroleum base oil.
Seals available for other fluids.

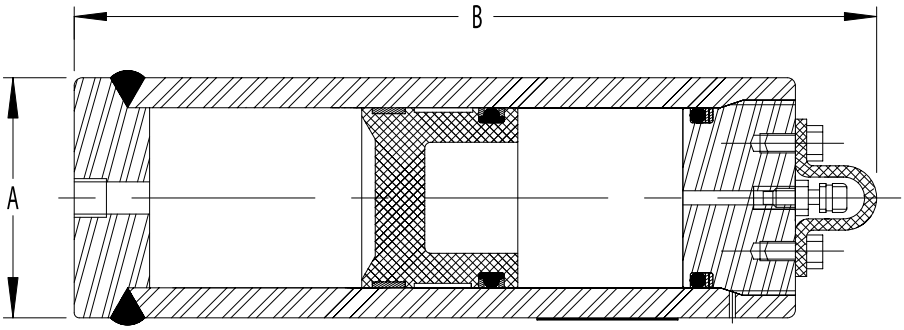


Illustrations are representational and not necessarily indicative of how any particular model will be built.

# 3,000 PSI Series

## 3AT30 Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 3AT30-.5 | 15 | 246 | 0.0625 | 0.24 | 7 | 3 | 3 | 76 | 8.5 | 216 |
| 3AT30-1 | 32 | 524 | 0.125 | 0.5 | 8 | 4 | 3 | 76 | 11.375 | 289 |
| 3AT30-2 | 62 | 1,016 | 0.25 | 1 | 11 | 5 | 3 | 76 | 17.5 | 445 |
| 3AT30-4 | 116 | 1,901 | 0.5 | 2 | 19 | 9 | 3 | 76 | 29.3125 | 745 |




### GENERAL DESIGN DATA

Maximum Working Pressure 3,000PSI (207 Bar)
Maximum Proof Pressure 4,500 PSI (310 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE-8
(Note: Optional fluid port sizes and styles available)

Standard seal material for petroleum base oil. Seals available for other fluids.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications are subject to change without notice.

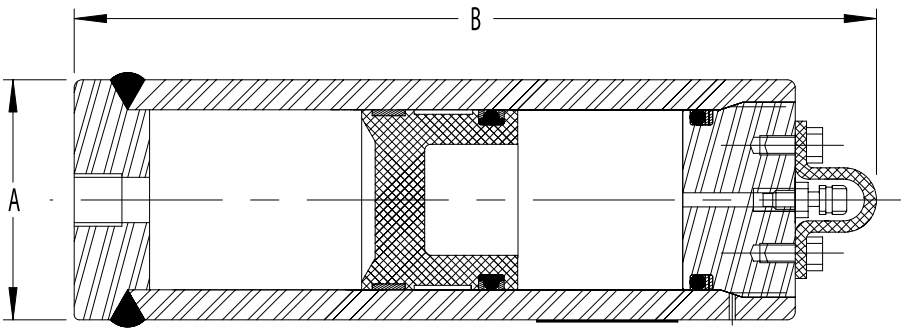
| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 3AT30-G40T-NST |
| Viton | 3AT30-G40T-ETT |
| EPR | 3AT30-G40T-HTT |

See Data Sheets for breakdown of parts.



## 4.7A30 Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 4.7A30-2 | 69 | 1,131 | 0.25 | 1 | 26 | 12 | 4.75 | 121 | 11.25 | 286 |
| 4.7A30-4 | 127 | 2,081 | 0.5 | 2 | 31 | 14 | 4.75 | 121 | 15.5 | 394 |
| 4.7A30-8 | 242 | 3,966 | 1 | 4 | 41 | 19 | 4.75 | 121 | 24.125 | 613 |
| 4.7A30-12 | 358 | 5,867 | 1.5 | 6 | 52 | 24 | 4.75 | 121 | 32.75 | 832 |
| 4.7A30-16 | 473 | 7,751 | 2 | 8 | 62 | 28 | 4.75 | 121 | 41.5 | 1,054 |
| 4.7A30-20 | 589 | 9,652 | 2.5 | 10 | 73 | 33 | 4.75 | 121 | 50.125 | 1,273 |
| 4.7A30-24 | 704 | 11,537 | 3 | 12 | 90 | 41 | 4.75 | 121 | 58.75 | 1,492 |




### GENERAL DESIGN DATA

Maximum Working Pressure 3,000PSI (207 Bar)
Maximum Proof Pressure 4,500 PSI (310 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE-16
(Note: Optional fluid port sizes and styles available)

Standard seal material for petroleum base oil. Seals available for other fluids.

ASME code stamp is not available as a standard.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

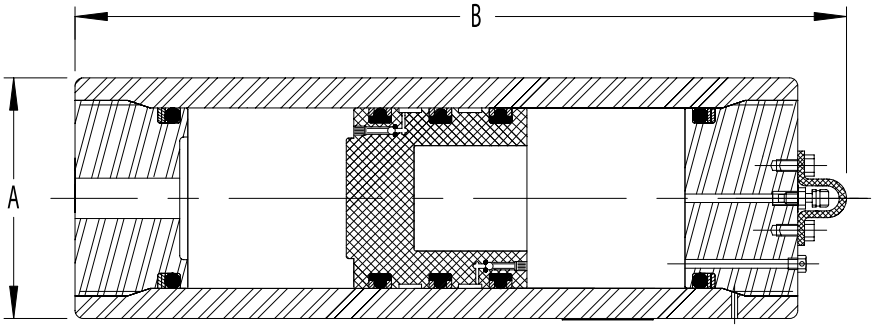
Specifications are subject to change without notice.

| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 4.7A30-G40T-NST |
| Viton | 4.7A30-G40T-ETT |
| EPR | 4.7A30-G40T-HTT |

See Data Sheets for breakdown of parts.

# 6.7A30 Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 6.7A30-8 | 252 | 4,130 | 1 | 4 | 97 | 44 | 6.75 | 171 | 18.25 | 464 |
| 6.7A30-12 | 369 | 6,047 | 1.5 | 6 | 112 | 51 | 6.75 | 171 | 22.625 | 575 |
| 6.7A30-20 | 599 | 9,816 | 2.5 | 10 | 143 | 65 | 6.75 | 171 | 31.125 | 797 |
| 6.7A30-40 | 1176 | 19,271 | 5 | 19 | 221 | 100 | 6.75 | 171 | 53.125 | 1,356 |
| 6.7A30-60 | 1754 | 28,743 | 7.5 | 28 | 300 | 136 | 6.75 | 171 | 75.125 | 1,915 |
| 6.7A30-80 | 2331 | 38,198 | 10 | 38 | 377 | 171 | 6.75 | 171 | 97.125 | 2,473 |




## GENERAL DESIGN DATA

Maximum Working Pressure 3,000PSI (172 Bar)
Maximum Proof Pressure 4,500 PSI (259 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE 1-1/2" 4-Bolt Code 61
(Note: Optional fluid port sizes and styles available)

Standard seal material for petroleum base oil. Seals available for other fluids.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications are subject to change without notice.

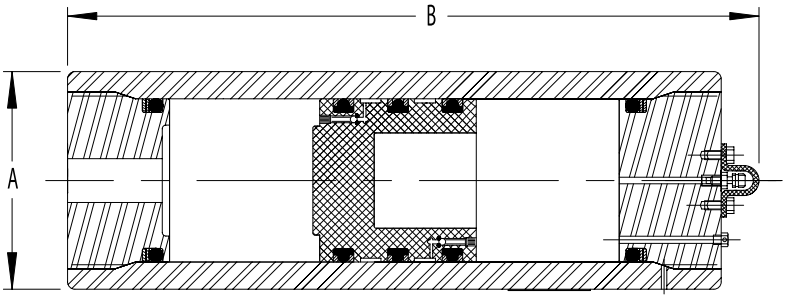
| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 6.7A30-G40T-NST |
| Viton | 6.7A30-G40T-ETT |
| EPR | 6.7A30-G40T-HTT |

See Data Sheets for breakdown of parts.



# 9A30 Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 9A30-20 | 612 | 10,030 | 2.5 | 9 | 192 | 87 | 9 | 229 | 23.25 | 591 |
| 9A30-40 | 1,191 | 19,515 | 5 | 19 | 256 | 116 | 9 | 229 | 35.875 | 912 |
| 9A30-60 | 1,765 | 28,925 | 7.5 | 28 | 320 | 145 | 9 | 229 | 48.5 | 1,232 |
| 9A30-80 | 2,347 | 38,465 | 10 | 38 | 385 | 175 | 9 | 229 | 61.25 | 1,556 |
| 9A30-100 | 2,918 | 47,819 | 12.5 | 47 | 448 | 203 | 9 | 229 | 73.75 | 1,873 |
| 9A30-120 | 3,495 | 57,266 | 15 | 57 | 513 | 232 | 9 | 229 | 86.375 | 2,194 |
| 9A30-140 | 4,071 | 66,713 | 17.5 | 66 | 576 | 261 | 9 | 229 | 99 | 2,515 |
| 9A30-160 | 4,648 | 76,160 | 20 | 76 | 641 | 291 | 9 | 229 | 111.625 | 2,835 |
| 9A30-200 | 5,806 | 95,148 | 25 | 95 | 770 | 349 | 9 | 229 | 137 | 3,480 |
| 9A30-240 | 6,959 | 114,042 | 30 | 114 | 898 | 407 | 9 | 229 | 162.25 | 4,121 |
| 9A30-320 | 9,265 | 151,831 | 40 | 151 | 1,154 | 523 | 9 | 229 | 212.75 | 5,404 |
| 9A30-400 | 11,571 | 189,619 | 50 | 189 | 1,411 | 640 | 9 | 229 | 263.25 | 6,687 |




## GENERAL DESIGN DATA

Maximum Working Pressure 3,000PSI (207 Bar)
Maximum Proof Pressure 4,500 PSI (310 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE 2" 4-Bolt Code 61
(Note: Optional fluid port sizes and styles available)

Standard seal material for petroleum base oil. Seals available for other fluids.
ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications are subject to change without notice.

| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 9A30-G40T-NST |
| Viton | 9A30-G40T-ETT |
| EPR | 9A30-G40T-HTT |

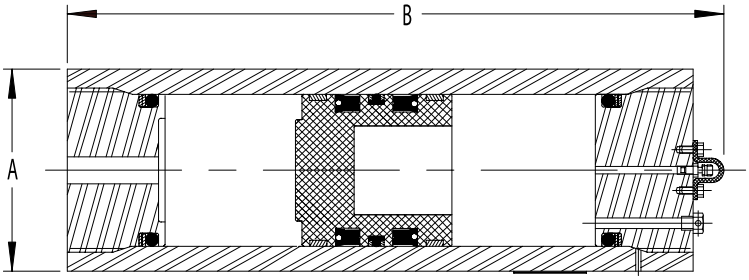
See Data Sheets for breakdown of parts.



Illustrations are representational and not necessarily indicative of how any particular model will be built.

# 14A30 Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 14A30-120 | 3,575 | 58,582 | 15 | 56 | 899 | 408 | 14 | 356 | 46.125 | 1,172 |
| 14A30-140 | 4,255 | 69,731 | 17.5 | 66 | 958 | 435 | 14 | 356 | 51.25 | 1,302 |
| 14A30-160 | 4,835 | 79,230 | 20 | 75 | 1,018 | 462 | 14 | 356 | 56.375 | 1,432 |
| 14A30-184 | 5,528 | 90,581 | 23 | 86 | 1,088 | 494 | 14 | 356 | 62.5 | 1,588 |
| 14A30-200 | 6,037 | 98,921 | 25 | 95 | 1,140 | 517 | 14 | 356 | 67 | 1,702 |
| 14A30-240 | 7,159 | 117,315 | 30 | 113 | 1,255 | 569 | 14 | 356 | 77 | 1,954 |
| 14A30-320 | 9,458 | 154,984 | 40 | 151 | 1,490 | 676 | 14 | 356 | 97.25 | 2,470 |
| 14A30-400 | 11,776 | 192,977 | 50 | 189 | 1,727 | 783 | 14 | 356 | 117.75 | 2,991 |
| 14A30-480 | 14,123 | 231,434 | 60 | 227 | 1,967 | 892 | 14 | 356 | 138.5 | 3,518 |
| 14A30-560 | 16,427 | 269,195 | 70 | 265 | 2,202 | 999 | 14 | 356 | 158.875 | 4,035 |
| 14A30-640 | 18,732 | 306,957 | 80 | 303 | 2,438 | 1,106 | 14 | 356 | 179.25 | 4,553 |
| 14A30-720 | 21,050 | 344,950 | 90 | 341 | 2,675 | 1,213 | 14 | 356 | 199.75 | 5,074 |
| 14A30-800 | 23,355 | 382,712 | 100 | 379 | 2,910 | 1,320 | 14 | 356 | 220.125 | 5,591 |




## GENERAL DESIGN DATA

Maximum Working Pressure 3,000PSI (207 Bar)
Maximum Proof Pressure 4,500 PSI (310 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE 2" 4-Bolt Code 61
(Note: Optional fluid port sizes and styles available)

Standard seal material for petroleum base oil.
Seals available for other fluids.

*Diameter for ASME code units is 14.38" (365 mm) and model number is 14.3A30-XXX.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications are subject to change without notice.

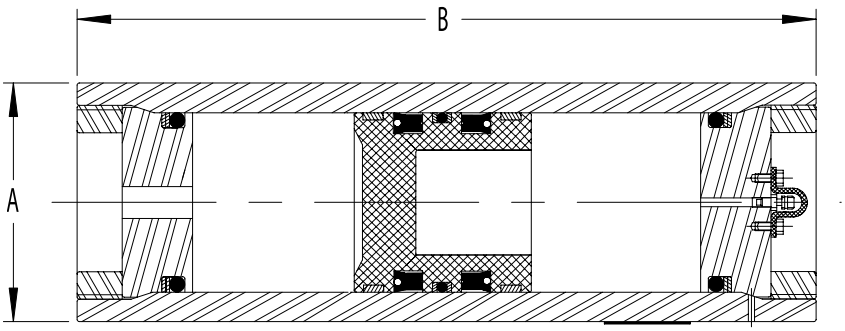
| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 14A30-G40P-NST |
| Viton | 14A30-G40P-ETT |
| EPR | 14A30-G40P-HTT |

See Data Sheets for breakdown of parts.



# 24A30 Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 24A30-400 | 12,555 | 205,750 | 50 | 189 | 3,687 | 1,672 | 23.75 | 603 | 65.4375 | 1,662 |
| 24A30-800 | 24,100 | 394,944 | 100 | 379 | 5,027 | 2,280 | 23.75 | 603 | 102.1875 | 2,596 |
| 24A30-1200 | 35,640 | 584,045 | 150 | 568 | 6,370 | 2,890 | 23.75 | 603 | 139 | 3,529 |
| 24A30-1600 | 47,190 | 773,316 | 200 | 757 | 7,711 | 3,498 | 23.75 | 603 | 175.75 | 4,463 |




## GENERAL DESIGN DATA

Maximum Working Pressure 3,000PSI (207 Bar)
Maximum Proof Pressure 4,500 PSI (310 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE 2" 4-Bolt Code 61
(Note: Optional fluid port sizes and styles available)

Standard seal material for petroleum base oil.
Seals available for other fluids.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications are subject to change without notice.

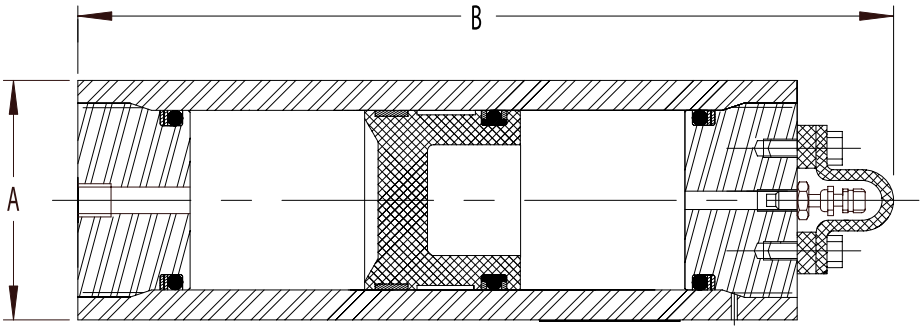
| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 24A30-G40P-NST |
| Viton | 24A30-G40P-ETT |
| EPR | 24A30-G40P-HTT |

See Data Sheets for breakdown of parts.

# 5,000 PSI Series

## 3.2AT50 Accumulators 5,000 PSI (345 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 3.2AT50-.5 | 14 | 226 | 0.0625 | 0.22 | 12 | 5 | 3.25 | 83 | 9.06 | 230 |
| 3.2AT50-1 | 30 | 498 | 0.125 | 0.49 | 15 | 7 | 3.25 | 83 | 12.44 | 316 |
| 3.2AT50-2 | 61 | 1000 | 0.25 | 1.00 | 21 | 10 | 3.25 | 83 | 18-69 | 475 |
| 3.2AT50-4 | 116 | 1900 | 0.5 | 2.00 | 32 | 14 | 3.25 | 83 | 29.88 | 759 |




### GENERAL DESIGN DATA

Maximum Working Pressure 5,000 PSI (345 Bar)
Maximum Proof Pressure 7,500 PSI (517 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE-8
(Note: Optional fluid port sizes and styles available)

Standard seal material for petroleum base oil.
Seals available for other fluids.
ASME code stamp is not available as a standard.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications subject to change without notice.

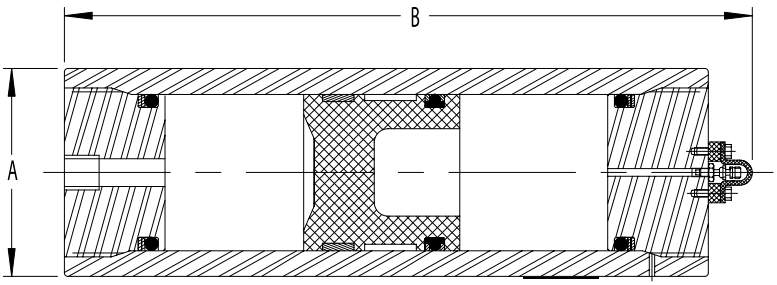
| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 32A50-G40T-NST |
| Viton | 32A50-G40T-ETT |
| EPR | 32A50-G40T-HTT |

See Data Sheets for breakdown of parts.



## 5.2A50 Accumulators 5,000 PSI (345 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 5.2A50-2 | 64 | 1,055 | 0.25 | 1 | 48 | 22 | 5.25 | 133 | 13.13 | 333 |
| 5.2A50-4 | 121 | 1,983 | 0.5 | 2 | 58 | 26 | 5.25 | 133 | 17.38 | 441 |
| 5.2A50-6 | 186 | 3,048 | 0.75 | 3 | 70 | 32 | 5.25 | 133 | 22.25 | 565 |
| 5.2A50-8 | 236 | 3,868 | 1 | 4 | 78 | 36 | 5.25 | 133 | 26 | 660 |
| 5.2A50-12 | 353 | 5,779 | 1.5 | 6 | 99 | 45 | 5.25 | 133 | 34.75 | 883 |
| 5.2A5016 | 468 | 7,663 | 2 | 7 | 119 | 54 | 5.25 | 133 | 43.38 | 1,102 |
| 5.2A50-20 | 583 | 9,548 | 2.5 | 9 | 139 | 63 | 5.25 | 133 | 52 | 1,321 |
| 5.2A50-24 | 698 | 11,432 | 3 | 11 | 160 | 72 | 5.25 | 133 | 60.63 | 1,540 |




### GENERAL DESIGN DATA

Maximum Working Pressure 5,000 PSI (345 Bar)
Maximum Proof Pressure 7,500 PSI (517 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE 16
(Note: Optional fluid port sizes and styles available)

Standard seal material for petroleum base oil.
Seals available for other fluids.

ASME code stamp is not available as a standard.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications subject to change without notice.

| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 52A50-G40T-NST |
| Viton | 52A50-G40T-ETT |
| EPR | 52A50-G40T-HTT |

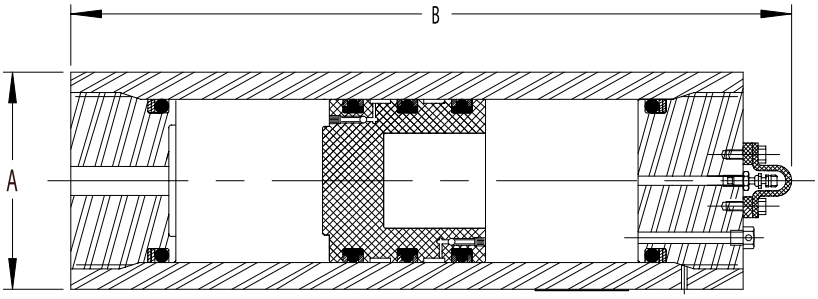
See Data Sheets for breakdown of parts.



Illustrations are representational and not necessarily indicative of how any particular model will be built.

# 9A50 Accumulators 5,000 PSI (345 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 9A50-20 | 607 | 9,951 | 2.5 | 9 | 250 | 113 | 9 | 229 | 27 | 679 |
| 9A50-40 | 1,183 | 19,385 | 5 | 19 | 348 | 158 | 9 | 229 | 41 | 1,048 |
| 9A50-60 | 1,759 | 28,819 | 7.5 | 28 | 446 | 202 | 9 | 229 | 56 | 1,416 |
| 9A50-80 | 2,334 | 38,253 | 10 | 37 | 544 | 247 | 9 | 229 | 70 | 1,784 |
| 9A50-100 | 2,910 | 47,687 | 12.5 | 47 | 643 | 292 | 9 | 229 | 85 | 2,153 |
| 9A50-120 | 3,486 | 57,121 | 15 | 56 | 741 | 336 | 9 | 229 | 99 | 2,521 |
| 9A50-140 | 4,061 | 66,555 | 17.5 | 66 | 839 | 381 | 9 | 229 | 114 | 2,889 |
| 9A50-160 | 4,637 | 75,989 | 20 | 75 | 937 | 425 | 9 | 229 | 128 | 3,258 |
| 9A50-200 | 5,793 | 94,938 | 25 | 94 | 1,134 | 514 | 9 | 229 | 157 | 3,997 |
| 9A50-240 | 6,945 | 113,806 | 30 | 113 | 1,330 | 603 | 9 | 229 | 186 | 4,734 |
| 9A50-320 | 9,238 | 151,379 | 40 | 151 | 1,724 | 782 | 9 | 229 | 245 | 6,210 |




## GENERAL DESIGN DATA

Maximum Working Pressure 5,000 PSI (345 Bar)
Maximum Proof Pressure 7,500 PSI (517 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE 2" 4-Bolt Code 62
(Note: Optional fluid port sizes and styles available)

Standard seal material for petroleum base oil.
Seals available for other fluids.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications subject to change without notice.

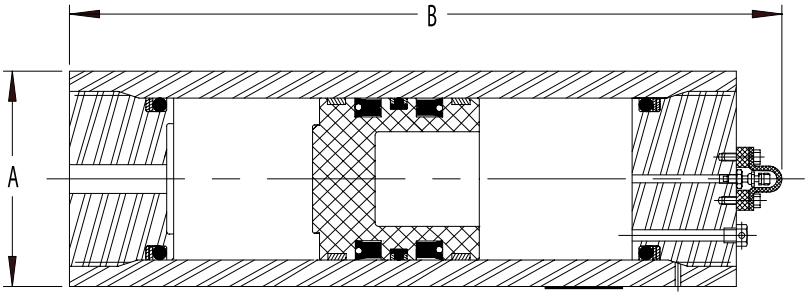
| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 9A50-G40T-NST |
| Viton | 9A50-G40T-ETT |
| EPR | 9A50-G40T-HTT |

See Data Sheets for breakdown of parts.



# 16A50 Accumulators 5,000 PSI (345 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 16A50-120 | 3,631 | 59,508 | 15 | 57 | 1,619 | 734 | 16 | 40 | 49.63 | 1,260 |
| 16A50-140 | 4,777 | 78,273 | 20 | 76 | 1,871 | 849 | 16 | 40 | 59.75 | 1,518 |
| 16A50-200 | 5,936 | 97,270 | 25 | 95 | 2,126 | 964 | 16 | 40 | 70 | 1,778 |
| 16A50-240 | 7,095 | 116,266 | 30 | 114 | 2,381 | 1,080 | 16 | 40 | 80.25 | 2,038 |
| 16A50-320 | 9,399 | 154,028 | 40 | 151 | 2,889 | 1,310 | 16 | 40 | 100.63 | 2,556 |
| 16A50-400 | 11,704 | 191,789 | 50 | 189 | 3,396 | 1,540 | 16 | 40 | 121 | 3,073 |
| 16A50-480 | 14,051 | 230,246 | 60 | 228 | 3,912 | 1,775 | 16 | 40 | 141.75 | 3,600 |
| 16A50-560 | 16,312 | 267,312 | 70 | 265 | 4,410 | 2,000 | 16 | 40 | 161.75 | 4,108 |
| 16A50-640 | 18,645 | 305,537 | 80 | 303 | 4,924 | 2,233 | 16 | 40 | 182.38 | 4,632 |
| 16A50-720 | 20,949 | 343,298 | 90 | 341 | 5,431 | 2,463 | 16 | 40 | 202.38 | 5,150 |
| 16A50-800 | 23,268 | 381,292 | 100 | 379 | 5,941 | 2,695 | 16 | 40 | 223.25 | 5,671 |




## GENERAL DESIGN DATA

Maximum Working Pressure 5,000 PSI (345 Bar)
Maximum Proof Pressure 7,500 PSI (517 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size SAE 2" 4-Bolt Code 62
(Note: Optional fluid port sizes and styles available)

Standard seal material for petroleum base oil.
Seals available for other fluids.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications subject to change without notice.

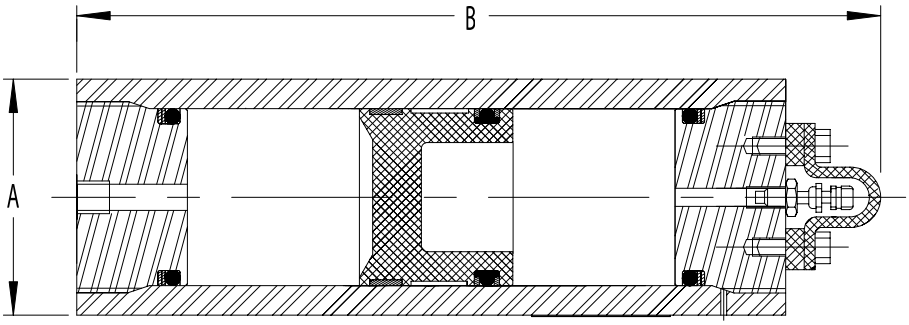
| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 16A50-G40P-NST |
| Viton | 16A50-G40P-ETT |
| EPR | 16A50-G40P-HTT |

See Data Sheets for breakdown of parts.

# 10,000 PSI Series

## 4AT100 Accumulators 10,000 PSI (690 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 4AT100-.5 | 15 | 251 | 0.5 | 0.25 | 25 | 11 | 4 | 102 | 10.38 | 264 |
| 4AT100-1 | 30 | 493 | 0.125 | 0.49 | 32 | 14 | 4 | 102 | 13.38 | 340 |
| 4AT100-2 | 60 | 675 | 0.25 | 1.00 | 45 | 20 | 4 | 102 | 19.38 | 492 |
| 4AT100-4 | 117 | 1910 | 0.5 | 2.00 | 70 | 32 | 4 | 102 | 31 | 787 |




### GENERAL DESIGN DATA

Maximum Working Pressure 10,000 PSI (690 Bar)
Maximum Proof Pressure 15,000 PSI (1,034 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size 1/2" NPT (Note: Optional MP -Medium & HP-High Pressure Porting available)

Standard seal material for petroleum base oil. Seals available for other fluids.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications subject to change without notice.

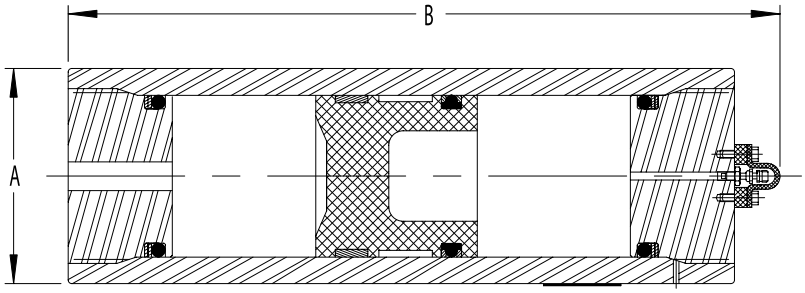
| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 4AT100-G40T-NST |
| Viton | 4AT100-G40T-ETT |
| EPR | 4AT100-G40T-HTT |

See Data Sheets for breakdown of parts.



## 8.5A100 Accumulators 10,000 PSI (690 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 8.5A100-8 | 244 | 3,992 | 1 | 4 | 243 | 110 | 8.5 | 216 | 22 | 559 |
| 8.5A100-12 | 361 | 5,914 | 1.5 | 6 | 275 | 125 | 8.5 | 216 | 26 | 660 |
| 8.5A100-16 | 478 | 7825 | 2 | 8 | 308 | 140 | 8.5 | 216 | 30.13 | 765 |
| 8.5A100-20 | 591 | 9,678 | 2.5 | 9 | 340 | 154 | 8.5 | 216 | 34.13 | 867 |
| 8.5A100-24 | 711 | 11,647 | 3 | 11 | 375 | 170 | 8.5 | 216 | 38.38 | 975 |
| 8.5A100-32 | 941 | 15,412 | 4 | 15 | 440 | 200 | 8.5 | 216 | 46.50 | 1,181 |
| 8.5A100-40 | 1,177 | 19,292 | 5 | 19 | 508 | 230 | 8.5 | 216 | 54.88 | 1,394 |
| 8.5A100-60 | 1,760 | 28,849 | 7.5 | 29 | 674 | 306 | 8.5 | 216 | 75.50 | 1,918 |
| 8.5A100-80 | 2,326 | 38,115 | 10 | 38 | 835 | 379 | 8.5 | 216 | 95.50 | 2,426 |
| 8.5A100-120 | 3,482 | 57,054 | 15 | 57 | 1,164 | 528 | 8.5 | 216 | 136.38 | 3,464 |
| 8.5A100-160 | 4,637 | 75,993 | 20 | 76 | 1,494 | 677 | 8.5 | 216 | 177.25 | 4,502 |




### GENERAL DESIGN DATA

Maximum Working Pressure 10,000 PSI (690 Bar)
Maximum Proof Pressure 15,000 PSI (1,034 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Fluid Port Size 1/2" NPT (Note: Optional MP -Medium & HP-High Pressure Porting available)

Standard seal material for petroleum base oil. Seals available for other fluids.

ASME code stamp is not available as a standard.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications subject to change without notice.

| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 8.5A100-G40T-NST |
| Viton | 8.5A100-G40T-ETT |
| EPR | 8.5A100-G40T-HTT |

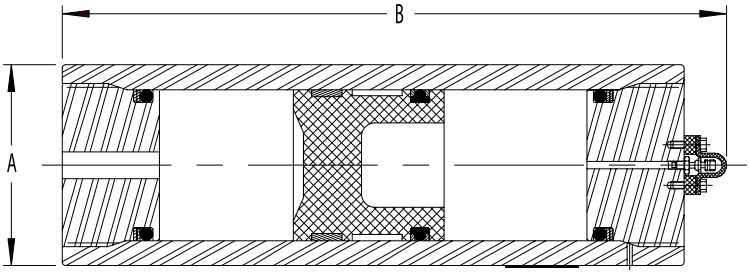
See Data Sheets for breakdown of parts.



Illustrations are representational and not necessarily indicative of how any particular model will be built.

# 11A100 Accumulators 10,000 PSI (690 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. |
| 11A100-8 | 246 | 4,025 | 1 | 4 | 478 | 217 | 11 | 279 | 22.50 | 572 |
| 11A100-12 | 362 | 5,932 | 1.5 | 6 | 577 | 262 | 11 | 279 | 27.38 | 695 |
| 11A100-16 | 478 | 7,830 | 2 | 8 | 675 | 306 | 11 | 279 | 32.25 | 819 |
| 11A100-20 | 594 | 9,728 | 2.5 | 9 | 773 | 351 | 11 | 279 | 37.13 | 943 |
| 11A100-24 | 709 | 11,626 | 3 | 11 | 872 | 395 | 11 | 279 | 42 | 1,067 |
| 11A100-32 | 941 | 15,413 | 4 | 15 | 1,068 | 485 | 11 | 279 | 51.75 | 1,314 |
| 11A100-40 | 1,172 | 19,209 | 5 | 19 | 1,265 | 574 | 11 | 279 | 61.50 | 1,562 |
| 11A100-60 | 1,748 | 28,650 | 7.5 | 28 | 1,754 | 796 | 11 | 279 | 85.75 | 2,178 |
| 11A100-80 | 2,327 | 38,140 | 10 | 38 | 2,246 | 1,019 | 11 | 279 | 110.13 | 2,797 |
| 11A100-120 | 3,483 | 57,071 | 15 | 57 | 3,227 | 1,464 | 11 | 279 | 158.75 | 4,032 |
| 11A100-160 | 4,638 | 76,002 | 20 | 76 | 4,207 | 1,908 | 11 | 279 | 207.38 | 5,267 |




## GENERAL DESIGN DATA

Maximum Working Pressure 10,000 PSI (690 Bar)
Maximum Proof Pressure 15,000 PSI (1,034 Bar)
Operating Temperature
(Buna/Nitrile) +52° to +200°F (+11° to 93°C)
Fluid Port Size ½" NPT (Note: Optional MP -Medium & HP-High Pressure Porting available)

Standard seal material for petroleum base oil. Seals available for other fluids.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications subject to change without notice.

| COMPLETE SEAL KITS | |
|---|---|
| TYPE | PART NO. |
| Buna-N | 11A100-G55-NST |
| Viton | 11A100-G55-ETT |
| EPR | 11A100-G55-HTT |

See Data Sheets for breakdown of parts.

# Greater than 10,000 PSI MAWP Applications

Currently, Tobul can produce special design units up to 20,000 PSI (1,379 Bar) in a limited range of dimensional sizes, volumes and materials.

Please contact Tobul Customer Service for details.

> ***Note:*** *A "Fast Quote/Design Specifications" Form is available for completion on our Tobul website (www.tobul.com).*

**Examples of Required information includes:**

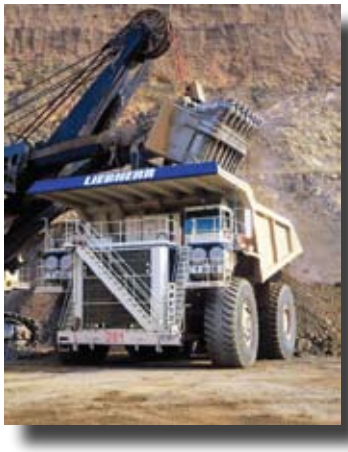
- Application
- Maximum system pressure
- Minimum system pressure
- Operating temperature range
- System fluid
- Fluid volume required
- Design certifications required
- System charge and dwell times (estimated if not known)

# Custom Design Series

Due to the large number of tested, proven designs created and sold over the past twenty-plus years, Tobul has the ability to manufacture an outstanding selection of accumulators, in sizes up to 24" OD, up to 20,000 PSI MAWP, and fluid volumes up to 300 gallons. This unequalled versatility allows Tobul to meet the diverse needs of many customers in varied markets and applications.

The majority of custom designs are based on Tobul's large variety of existing designs. Additionally, we have streamlined our sales engineering to manufacturing design process to save time – the customer does NOT pay a premium for this service. This enables us to quickly respond to our customers' varying needs. While not a "job shop," Tobul does design and manufacture to specific applications. These applications can be as diverse as the industries from which they originate...

- **Oil & Gas** - Onshore / Offshore / Sub-sea
- **Mobile Equipment** - Used in mining, construction, forestry, agriculture, industrial and commercial applications
- **Industrial / Process Engineering** - Used in machine tools, metal forming machinery, steel production, paper production, power transmission, injection molding, die casting, foundries, etc.
- **Aerospace**
- **Maritime**
- **Many others**





# Bladder-Type Accumulators

## An Overview

The typical bladder accumulator makes use of the considerable differences in the relative compressibility between a gas and a fluid. A typical design consists of a gas proof elastomer membrane enclosed within a steel shell. The membrane contains compressed gas (normally dry nitrogen) and separates the gas from the hydraulic fluid. The compressed gas provides a pneumatic spring action to force stored hydraulic fluid from the accumulator into the system as needed.

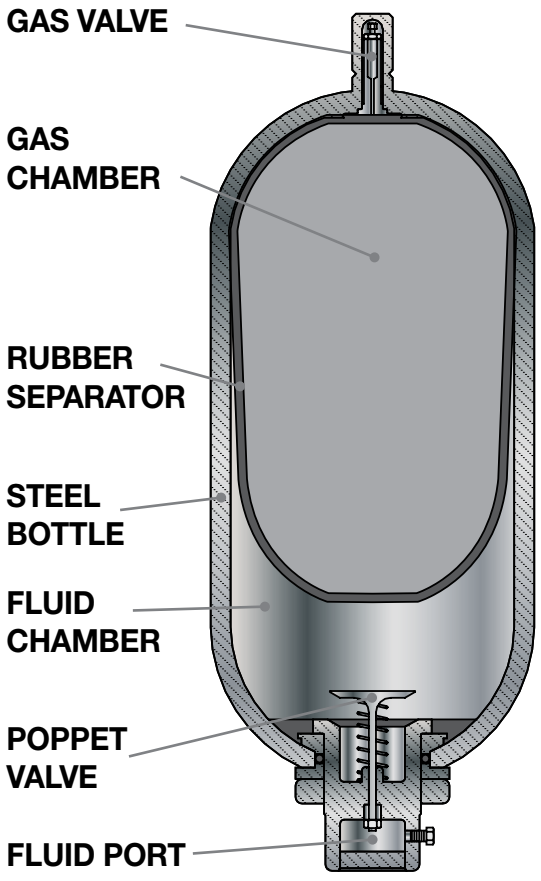
The steel shells are typically manufactured of homogenous seamless steel tubing with both ends formed hemispherically by spinning or forging. The shells are then heat treated and stress relieved to obtain the desired mechanical properties, as required by ASME Code Section VIII, Division 1 pressure vessel requirements. Corrosion resistance can be achieved with the use of stainless steel, but is more commonly obtained by plating the shell interior with nickel or coating with an epoxy or phenolic compound.

Common bladder-type accumulator capacities are one pint, one quart, and one through fifteen gallons (1, 2.5, 5, 10, 11, and 15). Bladders are commonly constructed of a particular elastomer (Buna-N, Butyl, EPR, Viton, etc.) specified to achieve a desired compatibility with the system fluid (hydraulic oil, water glycols, etc.) and elasticity throughout the operating temperature range (typically -20˚F to 200˚F). Normally, a spring-loaded poppet valve assembly is utilized to prevent extrusion of the bladder. This commonly limits the fluid flow rate to a maximum of 220 gallons per minute into the system from the accumulator, but higher flows can be obtained with a special poppet valve assembly.

The typical bladder-type accumulator is a bottom repairable design, in that the bladder is inserted into the shell through a bottom opening in the shell. This opening allows the installation of the oil port body/poppet valve assembly to seal the accumulator. Optional top repairable designs are available, along with various gas stem sizes (7/8" & 2") if desired. Tobul's parts and bladder kits are interchangeable with most major manufacturers.

Due to the limited volume capacities, it is common to find banks of bladder-type accumulators connected to a manifold in order to provide the desired quantity of fluid to a system. Unfortunately, this can cause physical space limitations in certain applications.

Generally, bladder-type units are connected to a system by threading a pressure connection directly into the fluid port of the accumulator. Various sized porting must be specified and may entail the use of special adaptors or bolt-on flanges to achieve desired fluid connections.







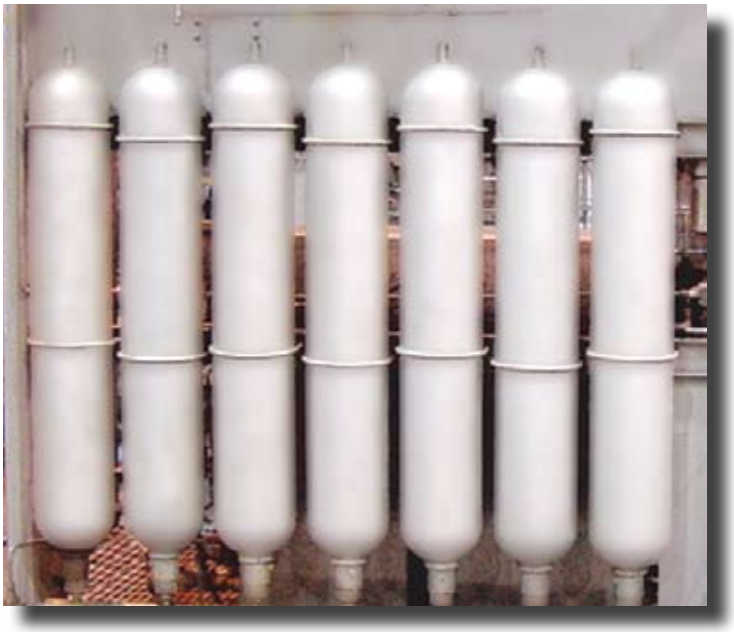

Illustrations are representational and not necessarily indicative of how any particular model will be built.

## Bottom repairable models

Bottom repairable bladder-type designs (Tobul model designation TBR) are the most commonly found units in the marketplace.

Fluid capacities are generally limited to a small variety of sizes (one pint to fifteen gallons/ approximately .5 Liter to 57 Liters).

Pressure ratings of these vessels are generally 3000 PSI (207 Bar), 5000 PSI (345 Bar) or less. Specially rated units, though, can contain up to 6600 PSI (455 Bar).

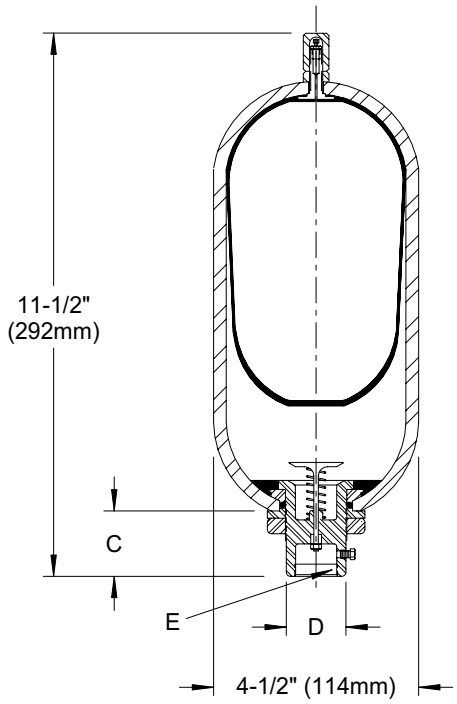



# TBR30 1 Quart

## Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | C | | D | | E |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. | |
| TBR30-.2* | 73 | 1,196 | .25 | 1 | 10 | 5 | 2.125 | 54 | 1.375 | 41 | SAE-20 or 1.25" NPT available as standard. To specify 1.25" NPT, add "P" to end of Accumulator Model Number. |

* = Bladder Material Suffix
N = BUNA-N B = BUTYL H = EPR E = VITON




### GENERAL DESIGN DATA

Maximum Working Pressure 3,000 PSI (207 Bar)
Maximum Proof Pressure 4,500 PSI (310 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)

Bladder for petroleum base oil.

Shell ASME "U" stamped.

Optional higher pressure rating of 4,000 PSI (276 Bar) available on request.

Specifications subject to change without notice.

**See Data Sheets for breakdown of parts.**

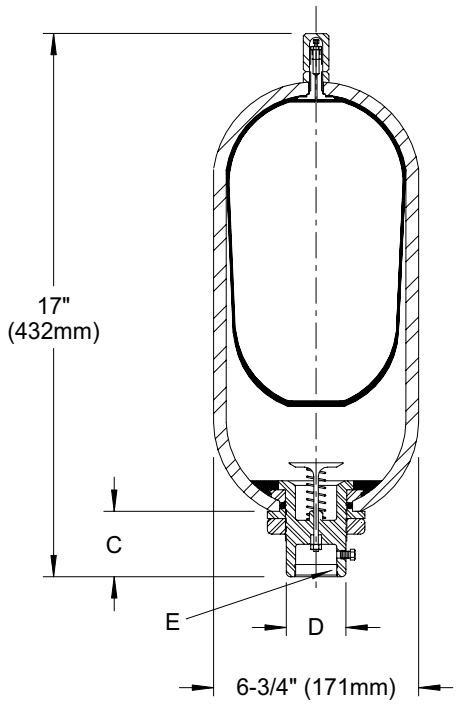


# TBR30 1 Gallon

## Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | C | | D | | E |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. | |
| TBR30-1* | 235 | 3,851 | 1 | 4 | 34 | 15 | 4 | 89 | 2.38 | 60 | SAE-20 or 1.25" NPT available as standard. To specify 1.25" NPT, add "P" to end of Accumulator Model Number. |

* = Bladder Material Suffix
N = BUNA-N B = BUTYL H = EPR E = VITON




### GENERAL DESIGN DATA

Maximum Working Pressure 3,000 PSI (207 Bar)
Maximum Proof Pressure 4,500 PSI (310 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)

Bladder for petroleum base oil.

Shell ASME "U" stamped.

Optional higher pressure rating of 4,000 PSI (276 Bar) available on request.

Specifications subject to change without notice.

**See Data Sheets for breakdown of parts.**



Illustrations are representational and not necessarily indicative of how any particular model will be built.

# TBR30 Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | |
| TBR30-2.5* | 600 | 9,832 | 2.5 | 10 | 80 | 36 | 21 | 533 | SAE-24 or 2" NPT available as standard. To specify 2" NPT, add "P" to end of Accumulator Model Number. |
| TBR30-5* | 1,203 | 19,714 | 5 | 19 | 120 | 54 | 33.25 | 845 | |
| TBR30-10* | 2,259 | 37,018 | 10 | 38 | 220 | 100 | 54 | 1,372 | |
| TBR30-11* | 2,535 | 41,541 | 11 | 42 | 240 | 109 | 59.5 | 1,511 | |
| TBR30-15* | 3,440 | 56,372 | 15 | 57 | 305 | 138 | 77.5 | 1,969 | |

* = Bladder Material Suffix
N = BUNA-N B = BUTYL H = EPR E = VITON

## GENERAL DESIGN DATA

Maximum Working Pressure 3,000 PSI (207 Bar)
Maximum Proof Pressure 4,500 PSI (310 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)

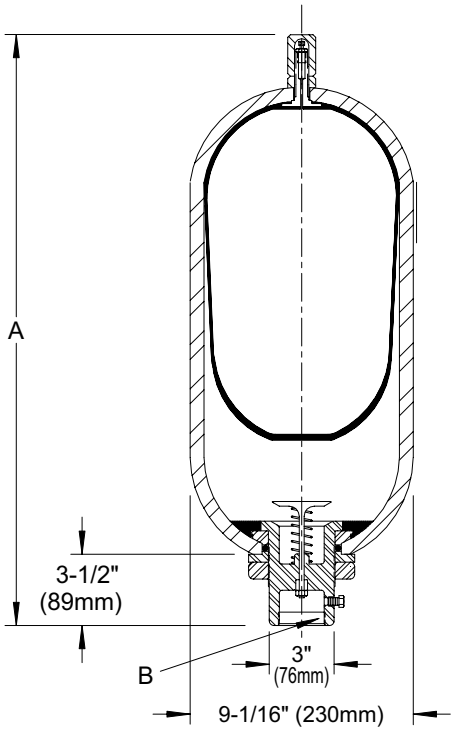
Bladder for petroleum base oil.

Shell ASME "U" stamped.

Optional higher pressure rating of 4,000 PSI (276 Bar) available on request.

Specifications subject to change without notice.

**See Page 32 for Repair Kits, Bladders, etc.**






# TBR50 Accumulators 5,000 PSI (345 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | |
| TBR50-2.5* | 577 | 9,454 | 2.5 | 10 | 120 | 54 | 21.5 | 546 | SAE-24 or 2" NPT available as standard. To specify 2" NPT, add "P" to end of Accumulator Model Number. |
| TBR50-5* | 1,151 | 18,858 | 5 | 19 | 220 | 100 | 33.75 | 857 | |
| TBR50-10* | 2,142 | 35,095 | 10 | 38 | 335 | 152 | 54.5 | 1,384 | |
| TBR50-15* | 3,260 | 53,413 | 15 | 57 | 485 | 220 | 78 | 1,981 | |

* = Bladder Material Suffix
N = BUNA-N B = BUTYL H = EPR E = VITON

## GENERAL DESIGN DATA

Maximum Working Pressure 5,000 PSI (345 Bar)
Maximum Proof Pressure 7,500 PSI (517 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)

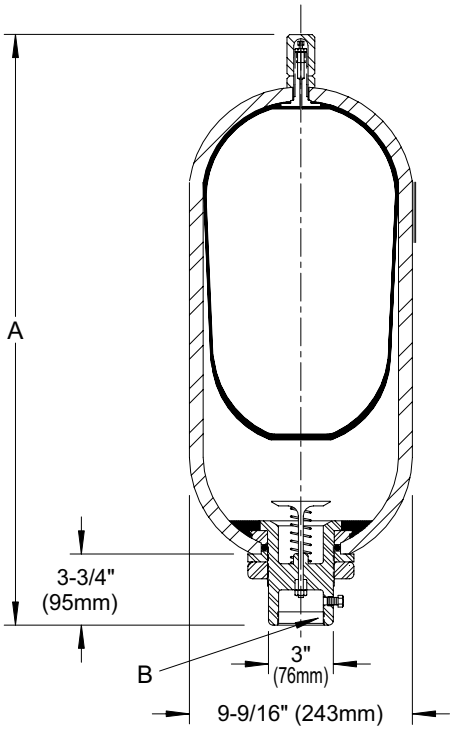
Bladder for petroleum base oil.

Shell ASME "U" stamped.

Optional higher pressure rating of 6,600 PSI (455 Bar) available on request.

Specifications subject to change without notice.

**See Page 32 for Repair Kits, Bladders, etc.**



# Bladder Accumulators

## Top repairable models

Top repairable bladder-type designs (Tobul model designation TBRT) are readily available in the marketplace, but much less commonly seen than bottom repairable units. TBRT's are more expensive than TBR's since an additional gas port body and anti-extrusion ring is necessary to completely seal the accumulator shell.

### Top Repairable Versus Bottom Repairable?

The distinct advantage of a TBRT (Top Repairable) unit is the fact that a unit may be repaired (i.e., bladder replaced) without dismounting an accumulator from the system. As long as the unit can be isolated and the system pressure relieved, the top gas port assembly can be accessed and a replacement bladder installed.

***Note:*** *It is extremely important to follow ALL guidelines for maintenance and repair of any pressure vessel! Please contact Tobul sales & service engineering (803-245-5111) for assistance with any questions. Please visit www.tobul.com for a downloadable copy of Tobul's Operating and Maintenance Procedures prior to beginning any procedure on any Tobul accumulator.*

# TBRT30 Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | |
| TBRT30-2.5* | 600 | 9,382 | 2.5 | 10 | 80 | 36 | 21 | 533 | SAE-24 or 2" NPT available as standard. To specify 2" NPT, add "P" to end of Accumulator Model Number. |
| TBRT30-5* | 1,203 | 19,714 | 5 | 19 | 120 | 54 | 33 | 838 | |
| TBRT30-10* | 2,259 | 37,018 | 10 | 38 | 220 | 100 | 54 | 1,372 | |
| TBR30T-11* | 2,535 | 41,541 | 11 | 42 | 240 | 109 | 59.5 | 1,511 | |
| TBRT30-15* | 3,440 | 56,372 | 15 | 57 | 305 | 138 | 77.5 | 1,969 | |

* = Bladder Material Suffix
N = BUNA-N B = BUTYL H = EPR E = VITON

## GENERAL DESIGN DATA

Maximum Working Pressure 3,000 PSI (207 Bar)
Maximum Proof Pressure 4,500 PSI (310 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)

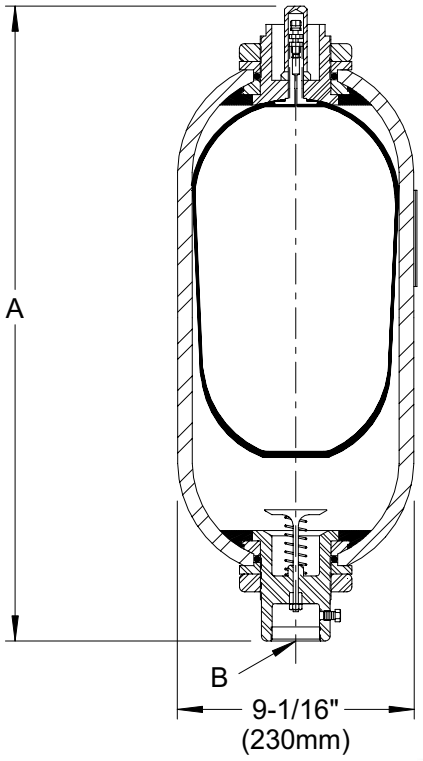
Bladder for petroleum base oil.

Shell ASME "U" stamped.

Optional higher pressure rating of 4,000 PSI (276 Bar) available on request.

Specifications subject to change without notice.

**See Page 32 for Repair Kits, Bladders, etc.**






# TBRT50 Accumulators 5,000 PSI (345 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | |
| TBRT50-2.5* | 577 | 9,454 | 2.5 | 10 | 120 | 54 | 21.5 | 546 | SAE-24 or 2" NPT available as standard. To specify 2" NPT, add "P" to end of Accumulator Model Number. |
| TBRT50-5* | 1,151 | 18,858 | 5 | 19 | 220 | 100 | 33.75 | 857 | |
| TBRT50-10* | 2,142 | 35,095 | 10 | 38 | 335 | 152 | 54.5 | 1,384 | |
| TBRT50-15* | 3,260 | 53,413 | 15 | 57 | 485 | 220 | 78 | 1,981 | |

* = Bladder Material Suffix
N = BUNA-N B = BUTYL H = EPR E = VITON

## GENERAL DESIGN DATA

Maximum Working Pressure 5,000 PSI (345 Bar)
Maximum Proof Pressure 7,500 PSI (517 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)

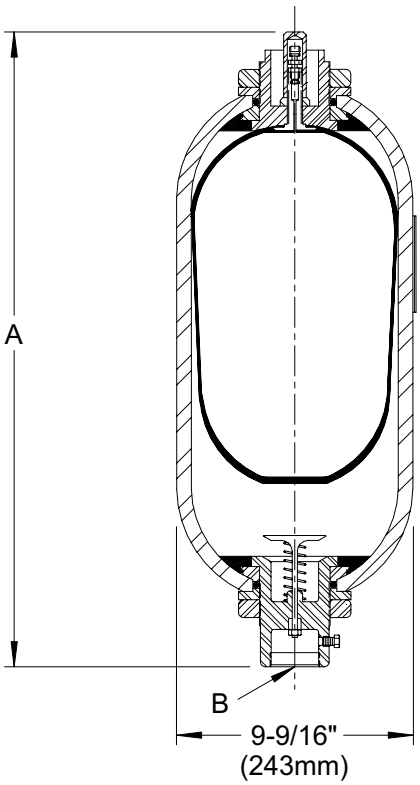
Bladder for petroleum base oil.

Shell ASME "U" stamped.

Optional higher pressure rating of 6,600 PSI (455 Bar) available on request.

Specifications subject to change without notice.

**See Page 32 for Repair Kits, Bladders, etc.**



# Econolator II®


## Open Top Bladder Accumulator

### Repairable

The "Econolator II®" is a Tobul product series which is a transition from piston-type accumulators to bladder-type accumulators, and incorporates characteristics of both designs…

- Utilizes a cylindrical steel cylinder with heads similar to piston-types. The fluid cap (bottom) is precision machine-welded into the steel cylinder to form a durable vessel.
- Utilizes an open top bladder available in a variety of sizes and elastomer materials (Buna-N/Butyl/EPR/Viton) similar to a diaphragm-type design. Whereas many diaphragm-type units are permanently sealed and non-repairable, the "Econolator II®" is repairable.
- Utilizes an upper cap and threaded ring assembly to retain and seal the open topped bladder, providing a simple "top-repairable" advantage; e.g., unit does not have to be removed from a vertically mounted application in order to replace bladder as long as Accumulator can be isolated from system pressure and physically accessible.
- Available in one quart and one gallon capacity at this time, with a one pint capacity unit to be released in the near future.

The EBR50 series (5,000 PSI) utilizes a threaded fluid end cap in addition to the upper gas cap and retaining ring assembly, similar to piston-type units.

# EBR20 Accumulators 2,000 PSI (137 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | | C | D | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. | | In. | mm. |
| EBR20-30 | 29 | 475 | 0.12 | .45 | 11 | 5 | 10 | 254 | 9.50 | 231 | SAE-8 | 3.25 | 83 |
| EBR20-60 | 58 | 950 | 0.25 | 1 | 25 | 11 | 10.125 | 257 | 8.875 | 225 | SAE-12 or .75" NPT available as standard To specify .75" NPT, add "P" to end of model number | 4.625 | 117 |
| EBR20-231 | 231 | 3,785 | 1 | 4 | 55 | 25 | 18 | 450 | 16.75 | 425 | SAE-16 or 1" NPT available as standard To specify 1" NPT, add "P" to end of model number | 5.75 | 146 |

## GENERAL DESIGN DATA

Maximum Working Pressure 2,000 PSI (138 Bar)
Maximum Proof Pressure 3,000 PSI (207 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)

Bladder for petroleum based oil.

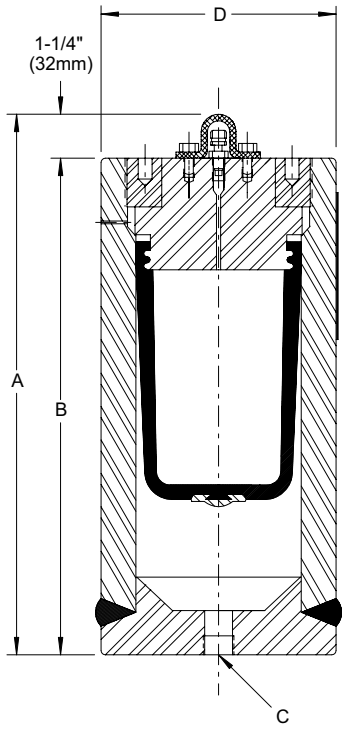
ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications subject to change without notice.

| REPLACEMENT BLADDERS | |
|---|---|
| TYPE | PART NO. |
| 1 Pint | SB-1247-30-B* |
| 1 Quart | SB-1247-60-B* |
| 1 Gallon | SB-1247-231-B* |

* = Bladder Material Suffix
B = Buna-N E = Viton H = EPR

See Data Sheets for breakdown of parts.






# EBR30 Accumulators 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | | C | D | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. | | In. | mm. |
| EBR30-30 | 29 | 475 | 0.12 | .45 | 11 | 5 | 10 | 254 | 9.50 | 231 | SAE-8 | 3.25 | 83 |
| EBR30-60 | 58 | 950 | 0.25 | 1 | 28 | 13 | 10.125 | 257 | 8.875 | 225 | SAE-12 or .75" NPT available as standard To specify .75" NPT, add "P" to end of model number | 4.75 | 121 |
| EBR30-231 | 231 | 3,785 | 1 | 4 | 60 | 27 | 18 | 450 | 16.75 | 425 | SAE-16 or 1" NPT available as standard To specify 1" NPT, add "P" to end of model number | 6 | 152 |

## GENERAL DESIGN DATA

Maximum Working Pressure 3,000 PSI (207 Bar)
Maximum Proof Pressure 4,500 PSI (310 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)

Bladder for petroleum based oil.

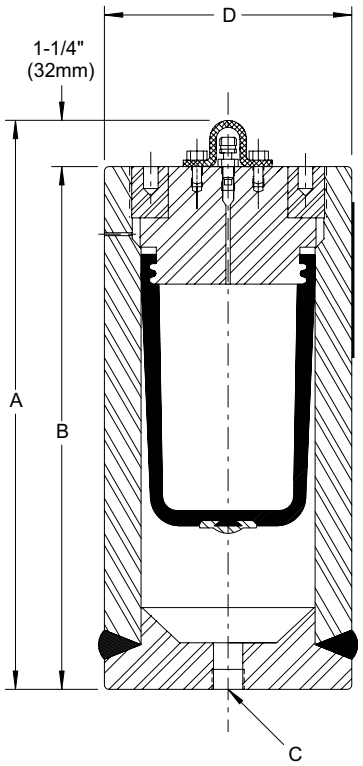
ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications subject to change without notice.

| REPLACEMENT BLADDERS | |
|---|---|
| TYPE | PART NO. |
| 1 Pint | SB-1247-30-B* |
| 1 Quart | SB-1247-60-B* |
| 1 Gallon | SB-1247-231-B* |

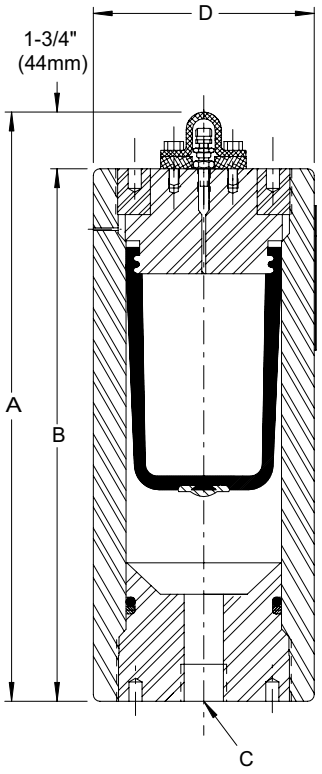
* = Bladder Material Suffix
B = Buna-N E = Viton H = EPR

See Data Sheets for breakdown of parts.



# EBR50 Accumulators 5,000 PSI (345 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B | | C | D | |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | In. | mm. | | In. | mm. |
| EBR50-30 | 29 | 475 | .12 | .45 | 17 | 7.7 | 12.875 | 308 | 10.375 | 264 | SAE-8 | 3.5 | 89 |
| EBR50-60 | 58 | 950 | 0.25 | 1 | 52 | 24 | 12.75 | 324 | 11 | 279 | SAE-12 or .75" NPT available as standard To specify .75" NPT, add "P" to end of model number | 5.25 | 133 |
| EBR50-231 | 231 | 3,785 | 1 | 4 | 104 | 47 | 20.25 | 514 | 18.5 | 470 | SAE-16 or 1" NPT available as standard To specify 1" NPT, add "P" to end of model number | 6.5 | 165 |




## GENERAL DESIGN DATA

Maximum Working Pressure 5,000 PSI (345 Bar)
Maximum Proof Pressure 7,500 PSI (517 Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)

Bladder for petroleum based oil.

ASME and other certification requirements may entail changes in materials, strengths, dimensional specifications and design parameters from those illustrated in this catalog.

Specifications subject to change without notice.

| REPLACEMENT BLADDERS | |
|---|---|
| TYPE | PART NO. |
| 1 Pint | SB-1247-30-B* |
| 1 Quart | SB-1247-60-B* |
| 1 Gallon | SB-1247-231-B* |

* = Bladder Material Suffix
B = Buna-N E = Viton H = EPR
See Data Sheets for breakdown of parts.

# Gas Bottles

## An Overview

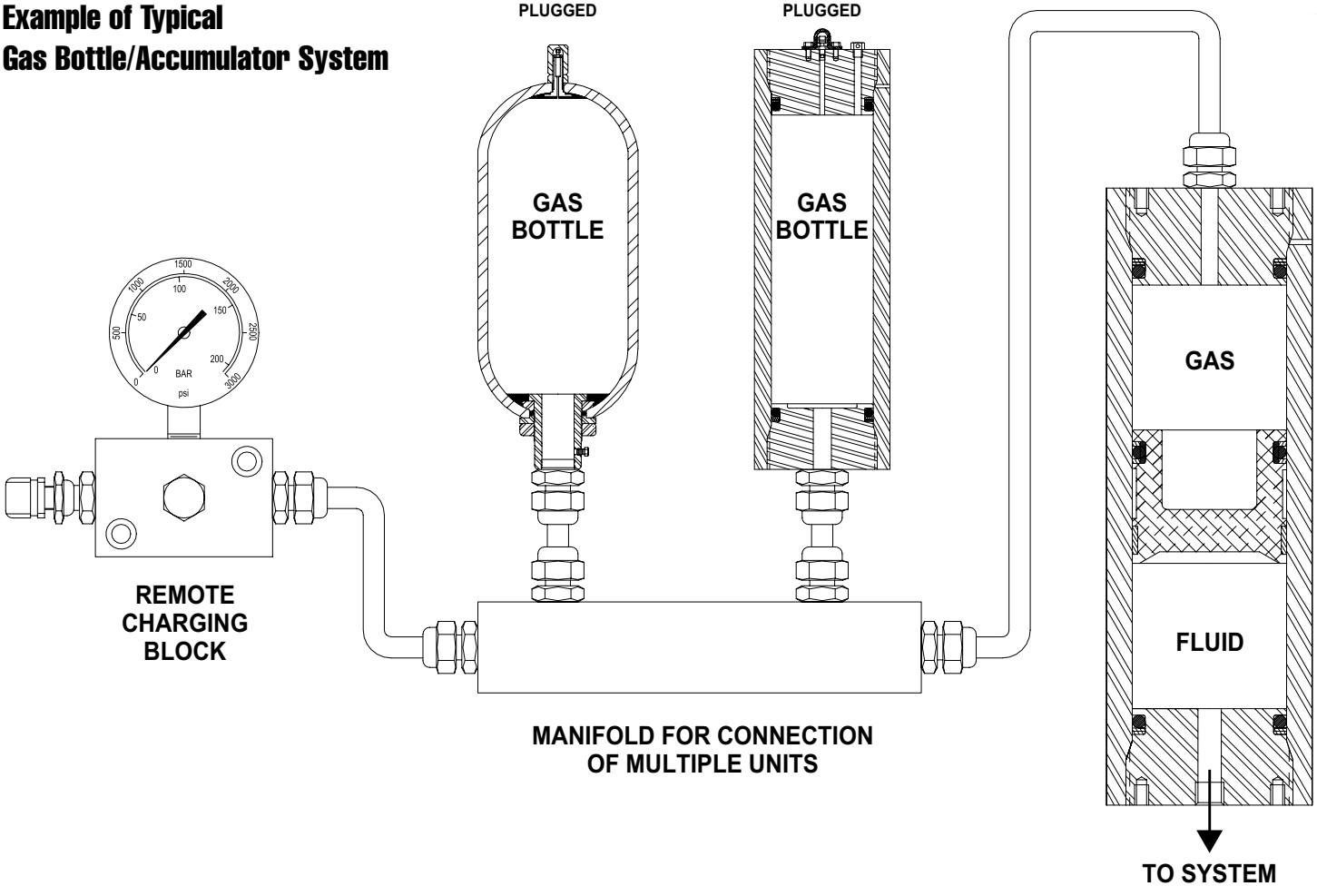
### Why Use Gas Bottles?

A standard hydro-pneumatic accumulator can provide approximately 25 to 30% of its fluid capacity in usable volume (e.g., approx. 38 gallons of capacity in a piston-type to obtain 10 gallons of fluid volume; approx. 42 gallons of capacity in a bladder-type to obtain 10 gallons of fluid volume).

The size of the accumulator can be reduced, though, by providing additional gas volume to the accumulator in order to expel a greater percentage of usable fluid volume from the unit (e.g., with Piston-type, the addition of approx. 28 gallons of pressurized gas capacity will allow the reduction of the necessary accumulator volume to 14 gallons and still receive 10 gallons of usable fluid volume; with Bladder-type, the addition of approx. 31 gallons of pressurized gas capacity will allow the reduction of the necessary accumulator volume to 11 gallons and still receive 10 gallons of usable fluid volume) Note: above approximations based on 3000 PSI max pressure/2000 PSI min pressure.

Since gas bottles are simply pressure vessels utilized to store a quantity of pressurized gas (normally nitrogen) without an internal bladder or piston, the effective cost per gallon of volume is less than the accumulator itself, thereby making gas bottles a cost-effective method of supplementing fluid volumes.

**Example of Typical Gas Bottle/Accumulator System**

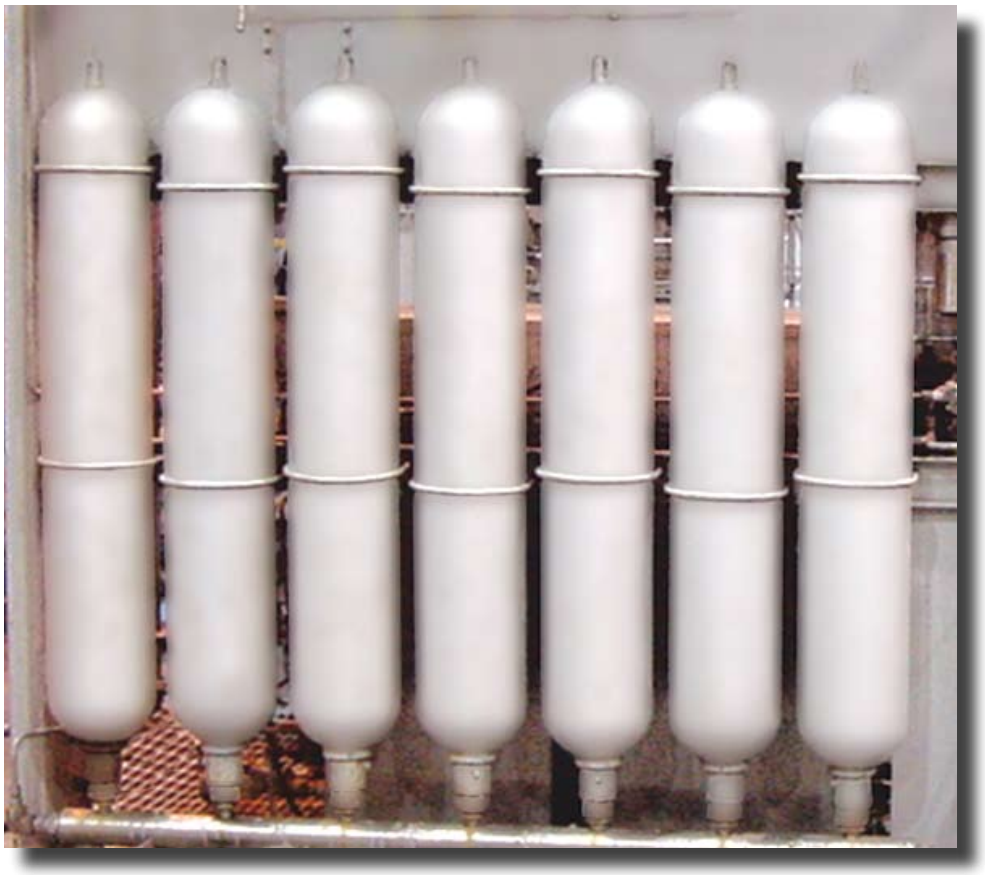


# Gas Bottles

## Forged Carbon Steel Shell

Forged steel shells without internal gas bladders are a cost-effective approach to providing additional gas volumes to selected systems.

Generally, these pressure vessels with hemispherical ends are readily available in the marketplace, and can sometime lead to a lower initial cost. Available only in a limited selection of sizes, though, multiple units may be "banked" (e.g., installed on a common manifold or header) to provide the required cumulative volumes.



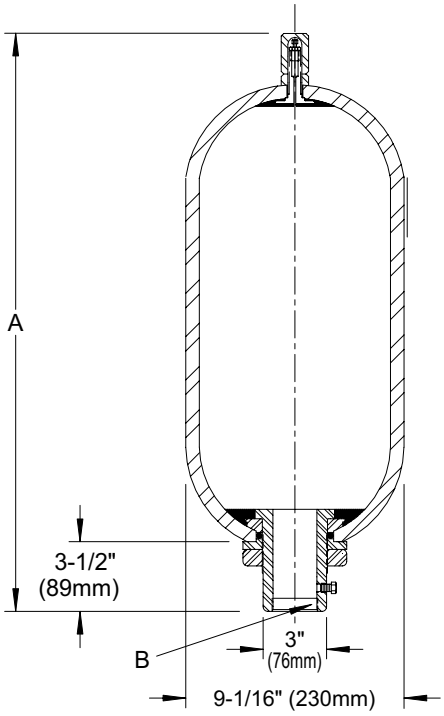
# TBRG30

## Gas Bottles 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | |
| TBRG30-2.5 | 577.5 | 9463 | 2.5 | 10 | 80 | 36 | 21 | 533 | SAE-24 or 2" NPT available as standard. To specify 2" NPT, add "P" to end of Accumulator Model Number. |
| TBRG30-5 | 1,155 | 18,927 | 5 | 19 | 126 | 57 | 33.25 | 845 | |
| TBRG30-10 | 2,310 | 37,854 | 10 | 38 | 205 | 93 | 54 | 1,372 | |
| TBRG30-11 | 2,541 | 41,639 | 11 | 42 | 226 | 103 | 59.5 | 1,511 | |
| TBRG30-15 | 3,465 | 56,781 | 15 | 57 | 297 | 135 | 77.5 | 1,969 | |

### GENERAL DESIGN DATA

Maximum Working Pressure 3,000 PSI (207 Bar)
Maximum Proof Pressure 4,500PSI (310Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)





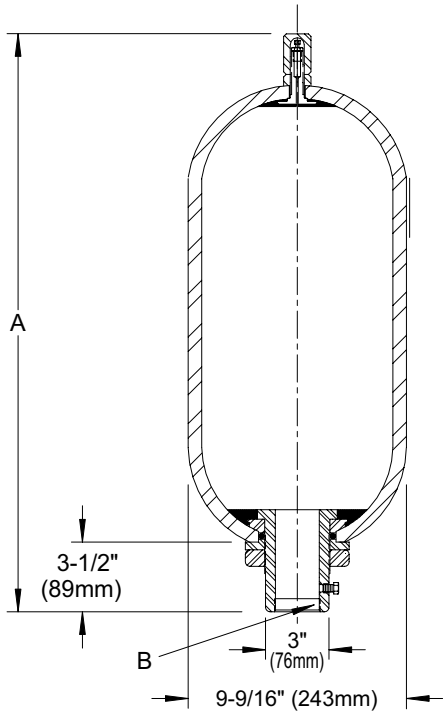

# TBRG50

## Gas Bottles 5,000 PSI (345 Bar)

| MODEL NUMBER | GAS CAPACITY | | FLUID CAPACITY | | DRY WEIGHT | | DIMENSION | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | A | | B |
| | In.³ | Cm.³ | Gallon | Liters | Lbs. | Kg. | In. | mm. | |
| TBRG50-2.5 | 577.5 | 9463 | 2.5 | 10 | 130 | 59 | 21.5 | 546 | SAE-24 or 2" NPT available as standard. To specify 2" NPT, add "P" to end of Accumulator Model Number. |
| TBRG50-5 | 1,155 | 18,927 | 5 | 19 | 225 | 102 | 33.75 | 857 | |
| TBRG50-10 | 2,310 | 37,854 | 10 | 38 | 340 | 155 | 54.5 | 1,384 | |
| TBRG50-15 | 3,465 | 56,781 | 15 | 57 | 490 | 223 | 78 | 1,981 | |

### GENERAL DESIGN DATA

Maximum Working Pressure 5,000 PSI (345 Bar)
Maximum Proof Pressure 7,500PSI (517Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)



# Gas Bottles

## Cylindrical Carbon Steel

Gas Bottles may be fabricated similar to piston-type accumulators (less the internal piston), providing a wide variety of available capacities and physical dimensions.

This allows for an extensive range of capacities, much larger than available with forged shells. The versatility in application provides the system designer the ability to eliminate banks of multiple smaller capacity shells with a minimum number of higher volume fabricated bottles. This is especially valuable in applications where space (e.g., physical dimensions) and weight are critical.

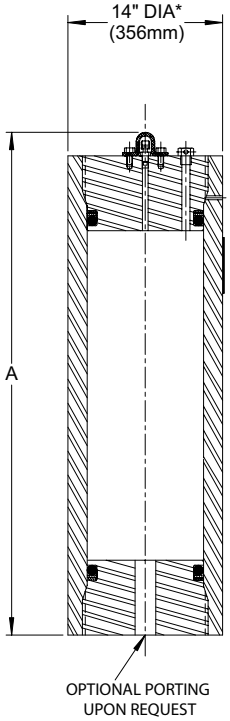
# 14AG30

## Gas Bottles 3,000 PSI (207 Bar)

| MODEL NUMBER | GAS CAPACITY | | | | DRY WEIGHT | | DIMENSION A | |
|---|---|---|---|---|---|---|---|---|
| | In.³ | Cm.³ | GALLONS | LITERS | Lbs. | Kg. | In. | mm. |
| 14AG30-120 | 3,476 | 56,955 | 15 | 57 | 759 | 344 | 41.25 | 1,048 |
| 14AG30-160 | 4,643 | 76,092 | 20 | 76 | 886 | 402 | 51.75 | 1,314 |
| 14AG30-200 | 5,783 | 94,774 | 25 | 95 | 1,010 | 458 | 62 | 1,575 |
| 14AG30-240 | 6,951 | 113,911 | 30 | 114 | 1,137 | 516 | 72.5 | 1,842 |
| 14AG30-320 | 9,259 | 151,729 | 40 | 152 | 1,388 | 629 | 93.25 | 2,369 |
| 14AG30-400 | 11,567 | 189,548 | 50 | 190 | 1,638 | 743 | 114 | 2,896 |
| 14AG30-480 | 13,875 | 227,366 | 60 | 227 | 1,889 | 857 | 134.75 | 3,423 |
| 14AG30-560 | 16,183 | 265,184 | 70 | 265 | 2,140 | 971 | 155.5 | 3,950 |
| 14AG30-640 | 18,490 | 303,003 | 80 | 303 | 2,391 | 1,085 | 176.25 | 4,477 |
| 14AG30-720 | 20,798 | 340,821 | 90 | 341 | 2,642 | 1,198 | 197 | 5,004 |
| 14AG30-800 | 23,106 | 378,640 | 100 | 379 | 2,893 | 1,312 | 217.75 | 5,531 |

### GENERAL DESIGN DATA

Maximum Working Pressure 3,000 PSI (207 Bar)
Maximum Proof Pressure 4,500PSI (310Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Larger volumes available upon request





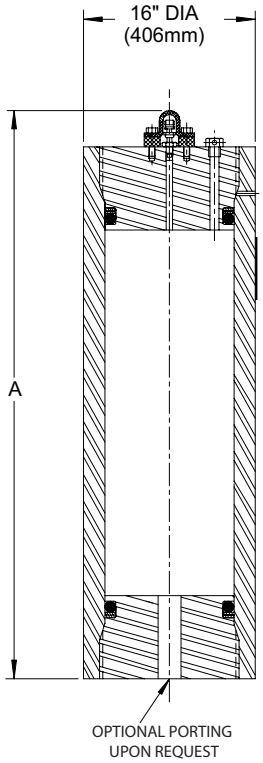

# 16AG50

## Gas Bottles 5,000 PSI (345 Bar)

| MODEL NUMBER | GAS CAPACITY | | | | DRY WEIGHT | | DIMENSION A | |
|---|---|---|---|---|---|---|---|---|
| | In.³ | Cm.³ | GALLONS | LITERS | Lbs. | Kg. | In. | mm. |
| 16AG50-120 | 3,476 | 56,955 | 15 | 57 | 1,406 | 638 | 43.75 | 1,111 |
| 16AG50-160 | 4,643 | 76,092 | 20 | 76 | 1,673 | 759 | 54.25 | 1,378 |
| 16AG50-200 | 5,783 | 94,774 | 25 | 95 | 1,934 | 877 | 64.5 | 1,638 |
| 16AG50-240 | 6,951 | 113,911 | 30 | 114 | 2,201 | 998 | 75 | 1,905 |
| 16AG50-320 | 9,259 | 151,729 | 40 | 152 | 2,728 | 1,238 | 95.75 | 2,432 |
| 16AG50-400 | 11,567 | 189,548 | 50 | 190 | 3,256 | 1,477 | 116.5 | 2,959 |
| 16AG50-480 | 13,875 | 227,366 | 60 | 227 | 3,783 | 1,716 | 137.25 | 3,486 |
| 16AG50-560 | 16,183 | 265,184 | 70 | 265 | 4,311 | 1,955 | 158 | 4,013 |
| 16AG50-640 | 18,490 | 303,003 | 80 | 303 | 4,839 | 2,195 | 178.75 | 4,540 |
| 16AG50-720 | 20,798 | 340,821 | 90 | 341 | 5,366 | 2,434 | 199.5 | 5,067 |
| 16AG50-800 | 23,106 | 378,640 | 100 | 379 | 5,894 | 2,673 | 220.25 | 5,594 |

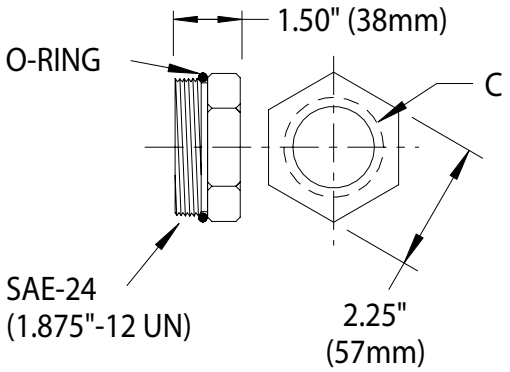
### GENERAL DESIGN DATA

Maximum Working Pressure 5,000 PSI (345 Bar)
Maximum Proof Pressure 7,500PSI (517Bar)
Operating Temperature
(Buna/Nitrile) -20° to +200°F (-28° to 93°C)
Larger volumes available upon request



# Bladder-Type Optional Components / Repair Kits

| OIL PORT ADAPTORS | |
|---|---|
| **PART NO.** | **"C"** |
| TB-100-01 | 0.25" NPT |
| TB-100-02 | 0.375" NPT |
| TB-100-03 | 0.5" NPT |
| TB-100-04 | 0.75" NPT |
| TB-100-05 | 1" NPT |
| TB-100-06 | SAE-5 (0.5"-20) |
| TB-100-07 | SAE-6 (0.5625"-18) |
| TB-100-08 | SAE-8 (0.75"-16) |
| TB-100-09 | SAE-10 (0.875"-14) |
| TB-100-10 | SAE-12 (1.0625"-12) |
| TB-100-11 | SAE-14 (1.1875"-12) |
| TB-100-12 | SAE-16 (1.3125"-12) |
| METRIC AND SPECIAL SIZE ADAPTORS AVAILABLE | |




The standard Tobul fluid/oil port dimension is SAE-24, as seen on drawing above. These optional adaptors can reduce the fluid port size to as small as 0.25" NPT



# Repair Kits / Replacement Bladders 2.5 to 15 Gallons / Service Tools

| COMPLETE REPAIR KIT 3000 PSI UNITS | | | |
|---|---|---|---|
| **PART NO. (BUNA-N)** | **PART NO. (BUTYL)** | **PART NO. (EPR)** | **PART NO. (VITON)** |
| RB30-2.5-NT | RB30-2.5-BT | RB30-2.5-HT | RB30-2.5-ET |
| RB30-5-NT | RB30-5-BT | RB30-5-HT | RB30-5-ET |
| RB30-10-NT | RB30-10-BT | RB30-10-HT | RB30-10-ET |
| RB30-11-NT | RB30-11-BT | RB30-11-HT | RB30-11-ET |
| RB30-15-NT | RB30-15-BT | RB30-15-HT | RB30-15-ET |

Includes: (1) Bladder, (1) Gas Valve and O-Ring, (1) Poppet Valve O-Ring and (1) O-Ring Backup

| COMPLETE REPAIR KIT 5000 PSI UNITS | | | |
|---|---|---|---|
| **PART NO. (BUNA-N)** | **PART NO. (BUTYL)** | **PART NO. (EPR)** | **PART NO. (VITON)** |
| RB50-2.5-NT | RB50-2.5-BT | RB50-2.5-HT | RB50-2.5-ET |
| RB50-5-NT | RB50-5-BT | RB50-5-HT | RB50-5-ET |
| RB50-10-NT | RB50-10-BT | RB50-10-HT | RB50-10-ET |
| RB50-15-NT | RB50-15-BT | RB50-15-HT | RB50-15-ET |

Includes: (1) Bladder, (1) Gas Valve and O-Ring, (1) Poppet Valve O-Ring and (1) O-Ring Backup

| REPLACEMENT BLADDERS WITHOUT GAS VALVES | | |
|---|---|---|
| **PART NO.** | **CAPACITY** | |
| | **Gallons** | **Liters** |
| RB50-2.5-* | 2.5 Gallon | 10 Liters |
| RB50-5-* | 5 Gallon | 20 Liters |
| RB50-10-* | 10 Gallon | 40 Liters |
| RB50-15-* | 15 Gallon | 60 Liters |

* = Bladder Material Suffix
N = BUNA-N B = BUTYL H = EPR E = VITON

| BLADDER-TYPE SERVICE TOOLS | |
|---|---|
| **PART NO.** | **DESCRIPTION** |
| TB-3000 | Spanner Wrench for Bladder Series |
| TB-3001 | Valve Core Wrench |
| TB-3002-1 | 1 Quart to 2.5 Gallon Pull Rod |
| TB-3002-2 | 5 Gallon Pull Rod |
| TB-3002-3 | 10 & 11 Gallon Pull Rod |
| TB-3002-4 | 15 Gallon Pull Rod |

# Accessories

| For Bladder Type | SEE CATALOG... |
|---|---|
| Oil Port Adaptors | Page 32 |
| Complete Repair Kits | Page 32 |
| Replacement Bladder Bags | Page 32 |
| Service / Assembly Tools | Page 32 |
| Mounting Brackets / Sets | Page 38 |

| For Piston Type | SEE CATALOG... |
|---|---|
| Mounting Brackets / Sets | Page 37 |
| Assembly Sleeves (For aiding piston insertion) | Contact Tobul Customer Service |
| Fluid Drain Kits / Stop Tubes (to limit piston travel) | Contact Tobul Customer Service |



| For General Usage | SEE CATALOG... |
|---|---|
| Pressure Gauges | Page 34 - 35 |
| Nitrogen Charging Assemblies | Page 34 - 35 |
| Remote Charging Assemblies | Page 34 - 35 |
| Safety Shutoff Valves | Page 40 - 41 |
| Seal Kits / Replacement Parts | See Particular Model or Data Sheets |

## Options

| For details, potential applications, questions: | Contact Tobul Customer Service... |
|---|---|
| Rupture Disk Assemblies (9A-G704-XX) | for various pressure ratings |
| Anti-Corrosion Coating/Plating* | Nickel/Chrome/Phenolic/Epoxy |
| Mechanical Indicating Rod | For determining Piston Location |
| Linear Transducers (Internal/External) | For determining Piston Location |
| Proximity Sensors (Magnetic, etc.) | For determining Piston Location |
| Male x Female Adaptors - Provides 2-3 alternate ports for gauges, rupture disks, etc. | For Available Configurations |
| Special Porting, Connectors, Flanges, etc. | Customer Specification |

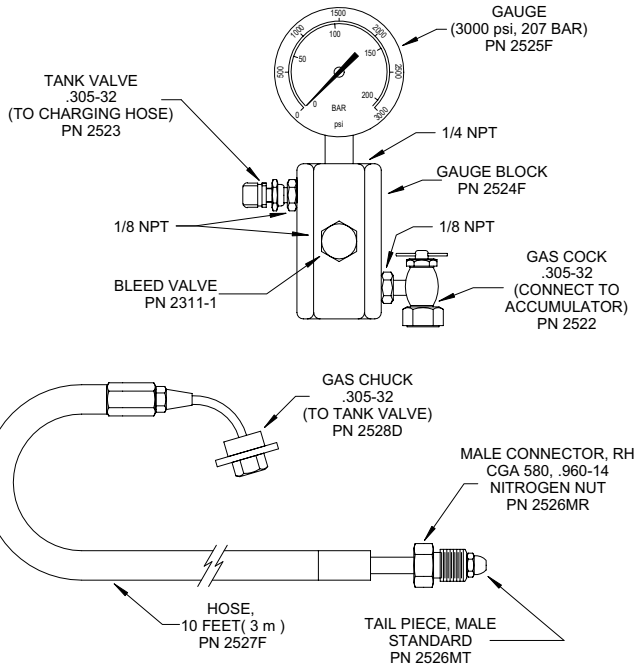
***Contact Tobul Customer Service 803.245.5111 or email to tobulmail@tobul.com***

# Nitrogen Charging Assemblies

| PART NUMBER | ITEM |
|---|---|
| G2525F | GAUGE ASSEMBLY |
| G2527F | CHARGING HOSE ASSEMBLY |
| GG2527F | COMPLETE CHARGING GAUGE & HOSE ASSEMBLY |
| GG2527F-C | COMPLETE CHARGING GAUGE & HOSE ASSEMBLY W/CASE |
| 2522-EXT | GAS COCK EXTENSION, OPTIONAL (Not Shown) |

Specifications subject to change without notice

## 3,000 PSI (207 Bar)



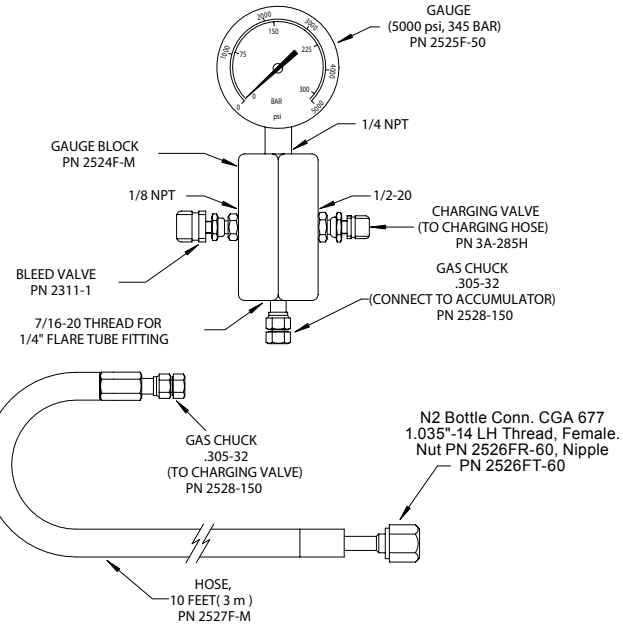



# Nitrogen Charging Assemblies

| PART NUMBER | ITEM |
|---|---|
| G2525F-M | GAUGE ASSEMBLY |
| G2527F-M | CHARGING HOSE ASSEMBLY |
| GG2527F-M | COMPLETE CHARGING GAUGE & HOSE ASSEMBLY |
| GG2527F-M-C | COMPLETE CHARGING GAUGE & HOSE ASSEMBLY W/CASE |

Specifications subject to change without notice

## 5,000 PSI (345 Bar)





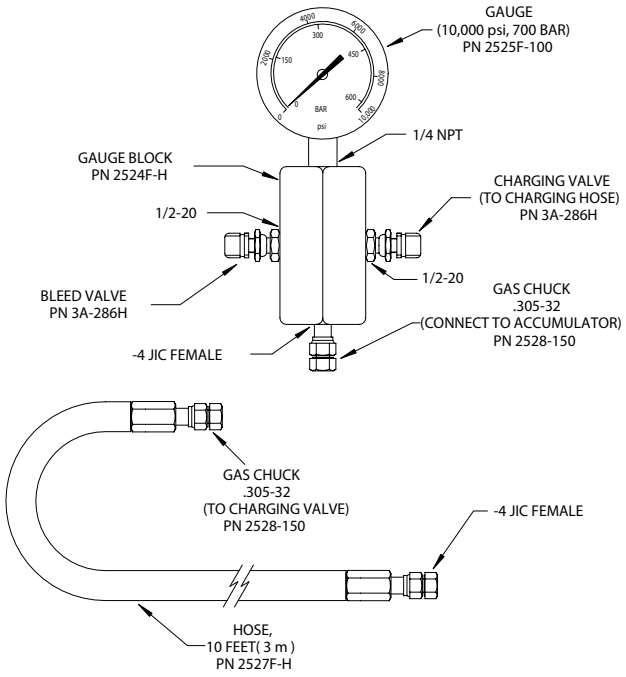

Illustrations are representational and not necessarily indicative of how any particular model will be built.

# Nitrogen Charging Assemblies

## 10,000 PSI (690 Bar)

| PART NUMBER | ITEM |
|---|---|
| G2525F-H | GAUGE ASSEMBLY |
| G2527F-H | CHARGING HOSE ASSEMBLY |
| GG2527F-H | COMPLETE CHARGING GAUGE & HOSE ASSEMBLY |
| GG2527F-H-C | COMPLETE CHARGING GAUGE & HOSE ASSEMBLY W/CASE |

Specifications subject to change without notice





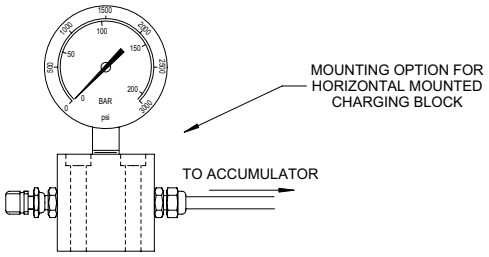

# Remote Nitrogen Charging Assemblies

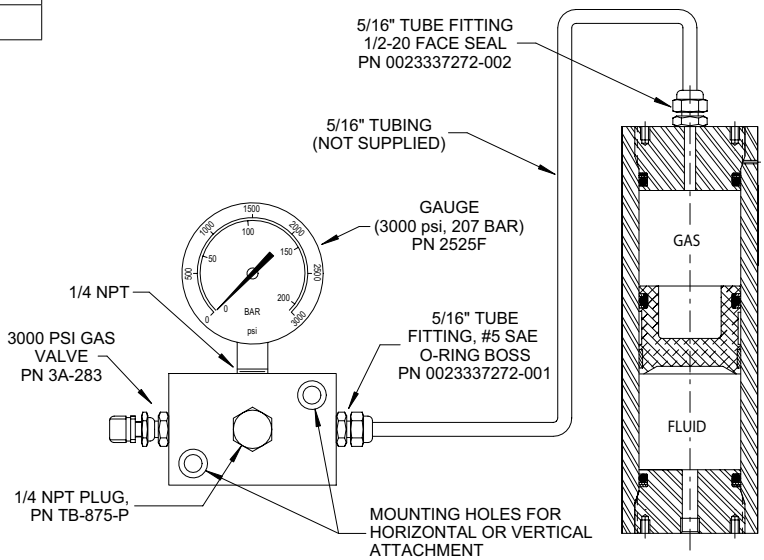
## 3,000 PSI (207 Bar)

| PART NUMBER | ITEM |
|---|---|
| G2526FB | REMOTE CHARGING BLOCK ASSEMBLY |
| G2526FBB | REMOTE CHARGING BLOCK ASSEMBLY, BLADDER |

Use G2526FBB with bladder type accumulators; substitutes SAE-3 face seal fitting for 1/2-20 face seal

Specifications subject to change without notice



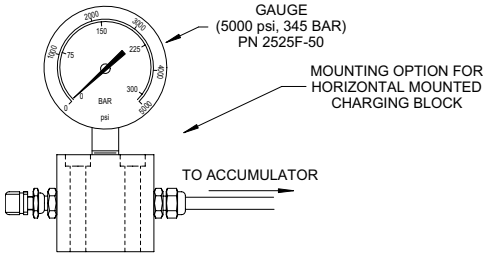



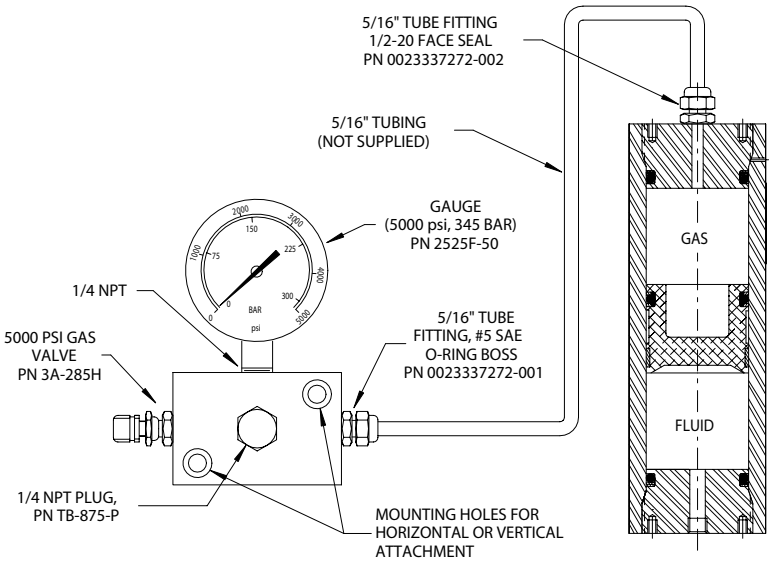
# Remote Nitrogen Charging Assemblies

## 5,000 PSI (345 Bar)

| PART NUMBER | ITEM |
|---|---|
| G2526FB-M | REMOTE CHARGING BLOCK ASSEMBLY |

Specifications subject to change without notice



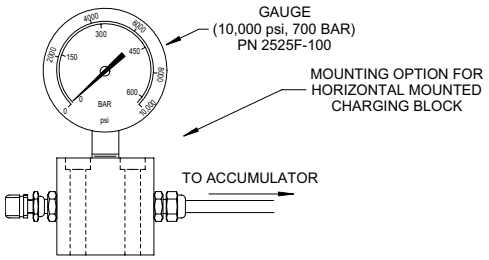


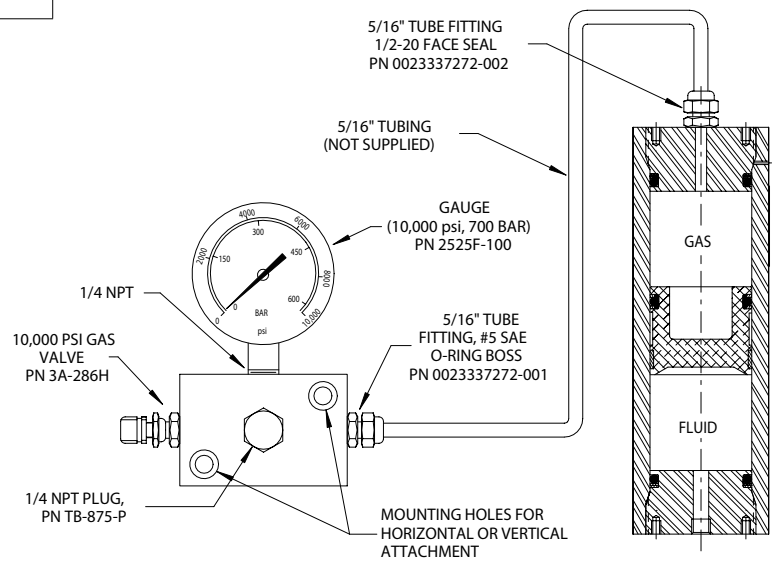

# Remote Nitrogen Charging Assemblies

## 10,000 PSI (690 Bar)

| PART NUMBER | ITEM |
|---|---|
| G2526FB-H | REMOTE CHARGING BLOCK ASSEMBLY |

Specifications subject to change without notice



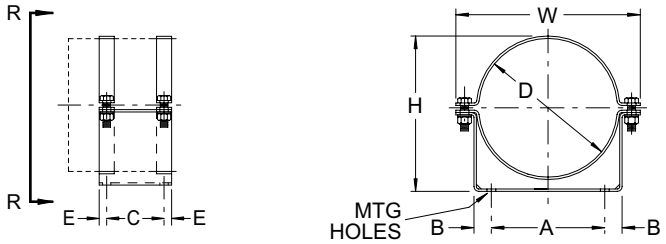






Illustrations are representational and not necessarily indicative of how any particular model will be built.

# Mounting Brackets Piston Type

## Upper Mounting Brackets

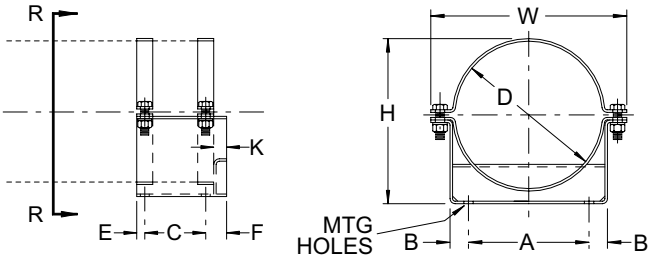



| PART NUMBER | ACCUMULATOR SERIES | DESCRIPTION | DIMENSION | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | D | | W | | H | | A | | B | | C | | E | | MOUNTING HOLES | | | |
| | | | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | Qty. | In. | mm. |
| **2.2AL-3338** | 2.2AL | UPPER | 2.3 | 57 | 4 | 102 | 3 | 77 | 1.5 | 38 | 0.5 | 13 | 3 | 76 | 0.38 | 10 | 4 | 0.4 | 10 |
| **2.2AL-8338** | | **PAIR** | | | | | | | | | | | | | | | | | | |
| **3A-3338** | 3AT30 | UPPER | 3 | 76 | 4.8 | 121 | 3.8 | 96 | 2 | 51 | 0.63 | 16 | 3.25 | 83 | 0.38 | 10 | 4 | 0.4 | 10 |
| **3A-8338** | | **PAIR** | | | | | | | | | | | | | | | | | | |
| **4AT-3338** | 4AT100 | UPPER | 4 | 102 | 5.8 | 148 | 5 | 127 | 3 | 76 | 0.6 | 16 | 3.8 | 95 | 0.4 | 10 | 4 | 0.4 | 10 |
| **4AT-8338** | | **PAIR** | | | | | | | | | | | | | | | | | | |
| **4.5AL-3338** | 4.5AL & 4.7A30 | UPPER | 4 | 102 | 5.8 | 148 | 5 | 127 | 3 | 76 | 0.63 | 16 | 3.75 | 95 | 0.38 | 10 | 4 | 0.4 | 10 |
| **4.5AL-8338** | | **PAIR** | | | | | | | | | | | | | | | | | | |
| **5.2A-3338** | 5.2A50 | UPPER | 5.2 | 133 | 7.2 | 181 | 6.1 | 155 | 3.5 | 89 | 1.06 | 27 | 3.75 | 95 | 0.63 | 16 | 4 | 0.4 | 10 |
| **5.2A-8338** | | **PAIR** | | | | | | | | | | | | | | | | | | |
| **6.7A-4336** | 6.7A20 & 30 | UPPER | 6.8 | 171 | 9.9 | 251 | 8.2 | 208 | 5 | 127 | 1.25 | 32 | 4.75 | 121 | 0.63 | 16 | 4 | 0.6 | 14 |
| **6.7A-8338** | | **PAIR*** | | | | | | | | | | | | | | | | | | |
| **9A-4336** | 9A30 & 50 | UPPER | 9 | 229 | 12.6 | 321 | 10.3 | 262 | 7 | 178 | 1.38 | 35 | 4.75 | 121 | 0.63 | 16 | 4 | 0.7 | 17 |
| **9A-8338** | | **PAIR*** | | | | | | | | | | | | | | | | | | |
| **14A30-4336** | 14A30 | UPPER | 14 | 356 | 26.6 | 676 | 18.6 | 473 | 23.1 | 587 | 1.8 | 46 | 8 | 203 | 2 | 51 | 4 | 0.7 | 17 |
| **14A30-8338** | | **PAIR*** | | | | | | | | | | | | | | | | | | |

*Pair consists of one upper bracket & one lower bracket.



## Lower Mounting Brackets




| PART NUMBER | ACCUMULATOR SERIES | DIMENSION | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | D | | W | | H | | A | | B | | C | | E | | F | | K | | MOUNTING HOLES | | |
| | | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | Qty. | In. | mm. |
| **6.7A-4335** | 6.7A20 & 30 | 6.8 | 171 | 9.9 | 251 | 8.2 | 208 | 5 | 127 | 1.25 | 32 | 4.75 | 121 | 0.63 | 16 | 1.25 | 32 | 0.63 | 16 | 4 | 0.6 | 14 |
| **9A-4335** | 9A30 & 50 | 9 | 229 | 12.6 | 321 | 10.3 | 262 | 7 | 178 | 1.38 | 35 | 4.75 | 121 | 0.63 | 16 | 1.63 | 41 | 1 | 25 | 4 | 0.7 | 17 |
| **14A30-4335** | 14A30 | 14 | 356 | 26.6 | 676 | 18.6 | 473 | 23.1 | 587 | 1.8 | 46 | 8 | 203 | 2 | 51 | 12 | 305 | 4 | 102 | 4 | 0.7 | 17 |

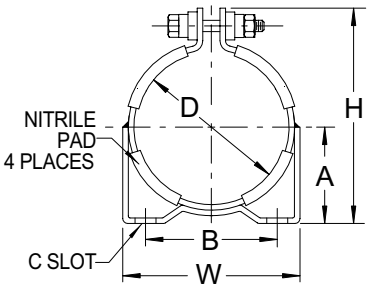
Specifications subject to change without notice

# Mounting Brackets Bladder Type

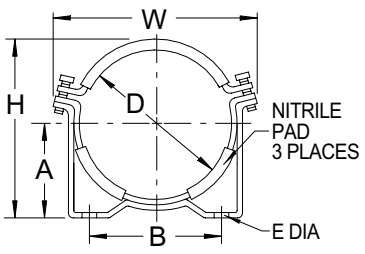
| BRACKET SETS (INCLUDES ONE UPPER & ONE LOWER EXCEPT WHERE NOTED) | |
|---|---|
| **PART NUMBER** | **USED ON ACCUMULATOR SERIES** |
| **TBR30-8338B** | TBR30, 1 GALLON |
| **TBR30-8338C** | TBR30, 2.5 TO 15 GALLON |
| **TBR30-8338CS** | 3 PIECE SEVERE DUTY (2 @ 4336C UPPER & 1 @ 4335C LOWER) |
| **TBR50-8338D** | TBR50, 2.5 TO 15 GALLON |
| **TBR50-8338DS** | 3 PIECE SEVERE DUTY (2 @ 4336D UPPER & 1 @ 4335D LOWER) |

Specifications subject to change without notice

Single Bolt - For use on one quart & one gallon units




Double Bolt - For use on larger 2.5, 5, 10, & 15 gallon units



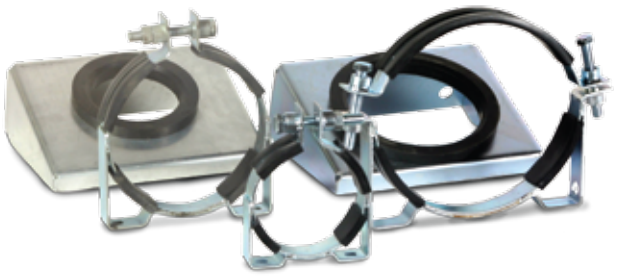

## Upper Mounting Brackets

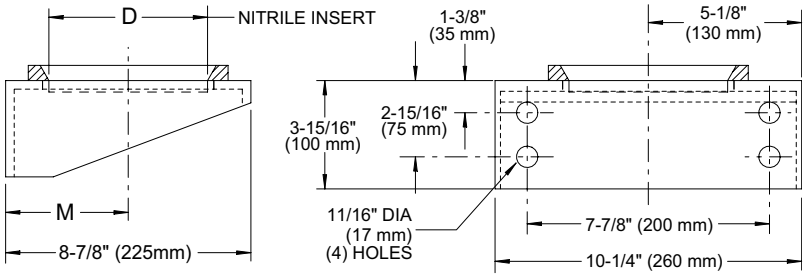
| PART NUMBER | ACCUMULATOR SERIES | STYLE | DIMENSION | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | D | | W | | H | | A | | B | | C-SLOT | | E-DIA. | | STRAP/BRACKET WIDTH | |
| | | | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. | In. | mm. |
| **TBR30-4336A** | TBR30, 1 QUART | SINGLE BOLT | 4.6 | 117 | 5.2 | 133 | 6.5 | 165 | 2.9 | 73 | 3.9 | 100 | 0.375 X 0.5 | 9 X 13 | NA | NA | 1.25 | 32 |
| **TBR30-4336B** | TBR30, 1 GALLON | SINGLE BOLT | 6.9 | 175 | 7.5 | 190 | 9 | 229 | 4.0 | 100 | 6 | 152 | 0.375 X 0.5 | 9 X 13 | NA | NA | 1.25 | 32 |
| **TBR30-4336C** | TBR30, 2.5 TO 15 GALLON | DOUBLE BOLT | 9.1 | 231 | 10 | 254 | 9.9 | 251 | 4.9 | 124 | 8.5 | 216 | NA | NA | 0.59 | 15 | 1.58 | 40 |
| **TBR50-4336D** | TBR50, 2.5 TO 15 GALLON | DOUBLE BOLT | 9.9 | 251 | 10 | 254 | 10.2 | 260 | 4.9 | 124 | 8.5 | 216 | NA | NA | 0.59 | 15 | 1.58 | 40 |

Specifications subject to change without notice



## Lower Mounting Brackets






| PART NUMBER | ACCUMULATOR SERIES | DESCRIPTION | DIMENSION | | | | NITRILE GROMMET PART NUMBER |
|---|---|---|---|---|---|---|---|
| | | | D | | M | | |
| | | | In. | mm. | In. | mm. | |
| **TBR30-4335B** | TBR30, 1 GALLON | SINGLE BOLT | 4.25 | 108 | 3.953 | 100 | TBR30-4334B |
| **TBR30-4335C** | TBR30, 2.5 TO 15 GALLON | DOUBLE BOLT | 6.3125 | 160 | 4.875 | 124 | TBR30-4334C |
| **TBR50-4335D** | TBR50, 2.5 TO 15 GALLON | DOUBLE BOLT | 6.3125 | 160 | 4.875 | 124 | TBR30-4334C |

Specifications subject to change without notice

# Accumulator Sizing & Selection Software

## Optimize the performance of hydraulic systems and accumulators with Tobul Accumulator's "Sizing and Selection Software"...

This custom designed software, offered on CD, is the latest Windows-based version, and the most powerful and comprehensive sizing and selection software offered to date.

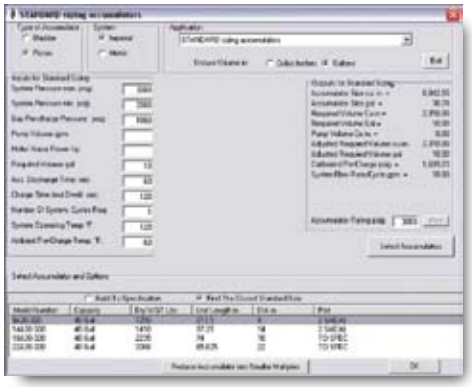
With the ability to easily select Piston-type or Bladder-type, and Imperial (US) or Metric measurements, the user can tailor the program to any one of fourteen different application modules…

- Standard Sizing of Accumulators
- Sizing for Emergency Power Source
- Sizing for Internal Valve Leakage
- Sizing for Line Shock Suppression
- Sizing for Thermal Expansion/Pipe Run Volumes
- Sizing for Pump Pulsation Suppression
- Reducing Accumulator Size w/use of Gas Bottles
- Effect of Ambient Temperatures vs. System Temperatures on Nitrogen Pressure
- Usable Volume available from known accumulator sizes
- Determine Volume required w/hydraulic cylinders
- Determine Volume required w/hydraulic motors
- Determine Velocity in Feet per second
- Determine Horsepower Required
- Determine Pressure Drop across a sharp-edged Orifice

**Sizing and Selection Software**
Part Number: **TASS-1.2.0.5**

Once the program determines an acceptable balance of hydraulic system requirements, it responds with a corresponding accumulator model number, gas and fluid volumes, length, diameter, weight, and other pertinent information. It allows for the selection of a custom specified model or the closest standard size; optionally, multiples of smaller sized standard units may be selected if desired. The resulting output can be viewed and printed (physically/digitally) and utilized as necessary.

The real advantage of optimizing accumulators and systems can be seen when an equipment supplier is able to customize his system quotations to their customers' needs, and show concrete examples of performance and initial costs balanced against on-going energy costs in various sized systems.



# Safety Shutoff Valves

Tobul Safety Shutoff Valves (TSV30/50) are designed to protect hydraulic systems from excess pressure; shut off hydraulic flow and isolate accumulators from the hydraulic system; and bleed off/discharge system pressure from accumulators and associated equipment. The optional electrical solenoid cartridge valve allows for the automatic release/bleed off of accumulator/system fluid pressure in the case of an emergency shutdown or loss of electrical power.

The Tobul TSV30/50 consists of a main ball valve shutoff in an all steel body; a manually operated needle-type pressure bleed cartridge valve; and an automatic overpressure relief cartridge valve, with various models designed for use in 3000 PSI or 5000 PSI systems. Additional porting is provided for a drain to reservoir/tank, and an optional sensor/gauge.

With a straight-through, free flow manual ball valve of ½" to 2" diameter (SAE O-ring style), the Tobul TSV has the capability to meet industries' diverse requirements for a durable, adaptable, cost-effective safety shutoff valve series for use with many types of accumulators and hydraulic systems.

- Safety shutoff valve provides manual isolation of the accumulator from the hydraulic system
- All valves have a straight-through, unrestricted full-flow opening
- Each valve incorporates a safety lock-out feature to prevent unauthorized operation; this conforms to OSHA's "Lock Out-Tag Out" program
- Non adjustable factory pre-set pressure relief valve prevents over pressurization of isolated accumulator
- Easy one hand operation
- Optional Electric solenoid pressure relief valve can be ordered normally open or normally closed to meet system requirements
- Machined from high grade steel with black oxide coating






Illustrations are representational and not necessarily indicative of how any particular model will be built.

# TSV Series - Safety Shutoff Valve

## 3,000 PSI (207 Bar) and 5,000 PSI (340 Bar) Hydraulic Systems

## Part Number Construction

**TSV** [ ] — [ ] [ ] [ ] [ ] [ ] [ ] — [ ]

**Pressure**
**30** = 3,000 PSI (207 Bar)
**50** = 5,000 PSI (340 Bar)

**Solenoid Function**
**0** = None
**1** = Normally Open (NO)*
**2** = Normally Closed (NC)*
***NOTE: Only available with (S) solenoid valve and manual valve***

**Pressure Release**
**M** = Manual Valve
**S** = Solenoid Valve** and Manual Valve
****NOTE: Must specify NO or NC solenoid function***

**Size**
**05** = 0.50 (SAE10)
**07** = 0.75 (SAE12)
**10** = 1.00 (SAE16)
**15** = 1.50 (SAE24)
**20** = 2.00 (SAE32)

**Seal Material**
**N** = Buna-N
**V** = Viton

**Voltage**
**0** = None
**1** = AC115 - 60 Hz
**2** = AC220 - 60 Hz
**3** = DC12V
**4** = DC24V
**5** = Other

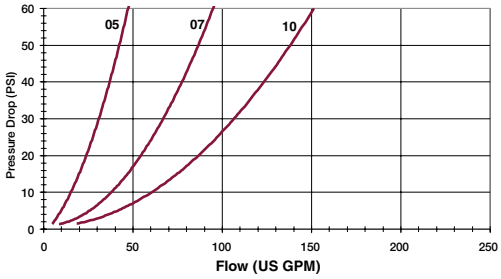
**Pressure Release**
Valve Setting
**33** = 3,300 PSI (Bar 227.5)
**53** = 5,300 PSI (Bar 365.4)

*Example:* **TSV** 30 — 0 M 10 V 0 — 33

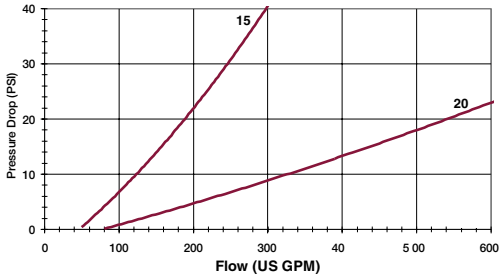
*Description:* 3,000 PSI (207 Bar) Safety Shutoff Valve, No Solenoid, Manual Valve, 1 inch (SAE16) System and Accumulator Ports, Viton Seal Material, 3,300 Pressure Release

## Pressure Drop Charts

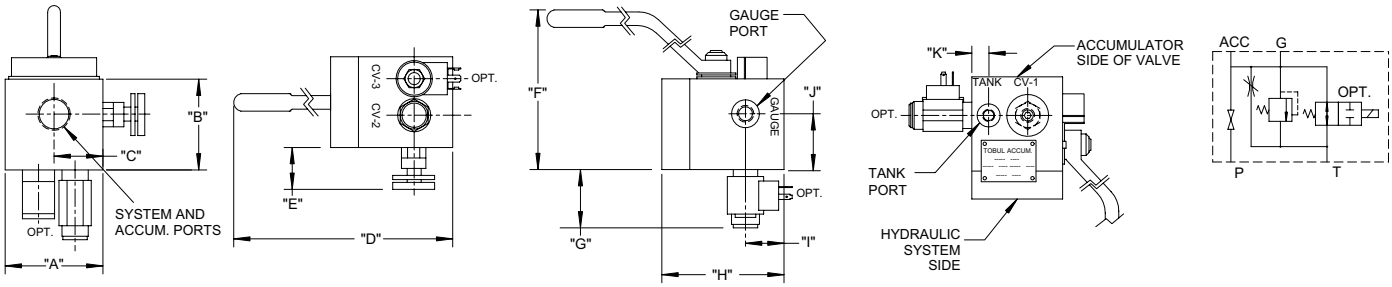
**Through Safety Shutoff Valve**
Small Valve Sizes, ½" to 1"




**Through Safety Shutoff Valve**
Large Valve Sizes, 1½" to 2"




## Dimensional Information




## Dimensions

| SYSTEM & ACCUMULATOR | A | | B | | C | | D | | E | | F | | G | | H | | I | | J | | K | | GAUGE | TANK |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PORT SIZE | In | mm | In | mm | In | mm | In | mm | In | mm | In | mm | In | mm | In | mm | In | mm | In | mm | In | mm | PORT | PORT |
| 1/2 (SAE 8) | 3.5 | 88.9 | 3.25 | 82.5 | 1.75 | 44.5 | 9.5 | 241 | 1.38 | 35.1 | 5.75 | 144.7 | 2.25 | 57.2 | 4.34 | 110.2 | 1.38 | 35.1 | 2 | 50.8 | 0.6 | 15.2 | SAE 4 | SAE 4 |
| 3/4 (SAE 12) | 3.5 | 88.9 | 3.25 | 82.5 | 1.75 | 44.5 | 9.5 | 241 | 1.38 | 35.1 | 5.75 | 144.7 | 2.25 | 57.2 | 4.34 | 110.2 | 1.38 | 35.1 | 2 | 50.8 | 0.6 | 15.2 | SAE 4 | SAE 4 |
| 1 (SAE 16) | 3.75 | 99.3 | 3.5 | 88.9 | 1.88 | 47.8 | 9.5 | 241 | 1.38 | 35.1 | 6 | 152.4 | 2.25 | 57.2 | 4.34 | 110.2 | 1.25 | 31.8 | 2.14 | 54.4 | 0.61 | 15.5 | SAE 4 | SAE 4 |
| 1-1/2 (SAE 24) | 4.25 | 114.3 | 4.25 | 107.9 | 2.25 | 57.2 | 12.5 | 319 | 1.38 | 35.1 | 7.38 | 187.3 | 2.25 | 57.2 | 5.46 | 138.6 | 1.25 | 31.8 | 2.14 | 54.4 | 0.61 | 15.5 | SAE 4 | SAE 4 |
| 2 (SAE 32) | 5.5 | 139.7 | 5 | 127 | 2.75 | 69.8 | 12.75 | 324 | 1.38 | 35.1 | 8.13 | 206.3 | 2.25 | 57.2 | 6.21 | 157.7 | 1.25 | 31.8 | 2.5 | 63.5 | 0.61 | 15.5 | SAE 4 | SAE 4 |

Dimensions are for reference only, all critical dimensions should be verified - consult factory for certified drawings

NOTE: **Port Adapters** – Consult Factory For Details: 803.245.5111

# Product Safety Guidelines

**WARNING! The improper selection and/or use and/or improper installation and/or maintenance of accumulators and related accessories can result in failure and/or death and/or personal injury and/or property damage.**

**Prior to the selection or installation or use of any Tobul Accumulator or related accessories, it is important that the user read, understand and follow all safety information.**

## OVERVIEW

Due to the wide variety of accumulator (hereafter referred to as "products") applications and operating conditions, Tobul Accumulator, Inc. does not warrant any particular product or products as suitable for any specific application. This safety guide does not consider and/or attempt to analyze all technical information and hydraulic system parameters which must be considered in selection of products.

Each user, through their own analysis, is solely responsible for determining the final selection of products and related accessories. The user shall be responsible for determining if the products are required to meet specific design requirements as required by any governmental agencies or industry standards applicable to the design of the user's equipment. User must insure that all safety requirements are met and safety guidelines are followed and that the particular use/application of any product and accessories presents no health or safety hazards. The user is also responsible for providing all appropriate health and safety warnings on the equipment on which the products will be used and/or installed.

## SEAL SELECTION CRITERIA

When selecting the seals for a particular application, it is extremely important to read and understand all pertinent information on the operating fluids to be used in the system or contact Tobul engineering for assistance. A wide variety of fluids can be utilized in systems and can occasionally have deleterious effects on the accumulator seals if the seal compounds are not compatible with the fluids. Additionally, dynamic seals are wear items. The rate of wear depends on many factors and can rapidly increase if the product and/or the system and/or the system fluid is not properly maintained/filtered.

## ACCUMULATOR MOUNTING and PORTING CONSIDERATIONS

Tobul Accumulator, Inc. recommends mounting of accumulators in a vertical configuration (with the fluid port on the bottom) for optimum performance. This configuration minimizes the chance that system/fluid contaminants may be deposited within the accumulator, as may occur when accumulators are mounted horizontally. Horizontal orientation and/or contamination can result in premature seal wear and/or premature failure.

Installers/users must insure accumulators are mounted securely, and the hydraulic system plumbing should never be the sole method of mounting. When "U-Bolt" type clamps are utilized, the installer/user must insure the clamps are not excessively tightened, especially on piston-type accumulators, to prevent distortion of the pressure vessel wall. Welding mounting brackets to any type of accumulator is NOT recommended.

Accumulator ports must be sufficiently sized to provide the required fluid flow as specified by the user, but must also be of a recommended design for the pressure rating of the system. The preferred port type is one sealed by an elastomeric seal designed for the system pressure, rather than an interference fit such as a pipe thread.

## ACCUMULATOR PRE-CHARGE

**WARNING!**

**ACCUMULATORS SHOULD BE CHARGED ONLY WITH AN INERT GAS, SUCH AS DRY NITROGEN. NEVER USE OXYGEN!**

Only qualified personnel following the manufacturer's instructions and utilizing only components specified by the accumulator manufacturer should perform pre-charging of an accumulator, or the periodic checking of proper pre-charge. Accumulators function due to differential pressures. The specific differential within the system is determined by the system's operating parameters. Variation from this pressure will cause the system to degrade in performance.

## REPAIRS AND MODIFICATIONS

Tobul products are NOT to be disassembled and/or modified after leaving the manufacturer. If products require modifications, these modifications must be performed by Tobul Accumulator, Inc. or by a factory authorized facility. Disassembly of any Tobul product for the purpose of preventive maintenance and/or seal replacement is allowed ONLY after proper factory authorized training of all involved personnel.

**ALL ACCUMULATORS ARE PRESSURE VESSELS AND MUST BE HANDLED WITH THE UTMOST CARE BY QUALIFIED PERSONNEL ONLY!**

Tobul

# Fast Quote/Design to Your Specs

**Duplicate blank form as necessary - Fax completed form to Tobul Sales Engineering 803-245-2636**

## Basic Information Section

Name _____

Address _____

City _____

State _____

Country _____

ZIP/Postal Code _____

Company Name _____

Phone _____

Fax _____

E-Mail _____

Standard Model? No ☐ Yes ☐

(If No, please also complete Custom Design Specification Section )

Pressure Units: PSI ☐ BAR ☐

Max Working Pressure? _____

Temperature Units: F° ☐ C° ☐

Temperature Range: High _____ Low _____

Piston or Bladder? Piston ☐ Bladder ☐

Accumulator Model? _____

(If Model not known, please complete information below)

Fluid Capacity? _____

Oil Port Size/Type? _____

Gas Port Size/Type? _____

Seals/Bladder material? _____

Fluid to be used? _____

Code Certifications? ASME ☐ Other? _____

## Standard Sizing Information Section

System Pressure - Max: _____

System Pressure - Min: _____

Gas Pre-Charge Pressure: _____

Fluid Volume Required: _____

Discharge Time in Seconds: _____

Charge Time/Dwell in sec.: _____

Number of System Cycles: _____

System Operating Temp: _____

Ambient Precharge Temp: _____

## General Description of Accumulator Application

_____

_____

_____

_____

## Custom Design Specification Section

Shell Material? _____

Head Material? _____

Piston Material? _____

Fluid Port-Type/Size? _____

Gas Port-Type/Size? _____

Additional Porting? No ☐ Yes ☐ if Yes, describe below

Seal Material: Buna-N ☐ Viton® ☐

EPR ☐ Low Temp Nitrile ☐

Other? _____

Viton® is a registered trademark of E.I. DuPont de Nemours

Typical Options:
*(Check if needed)*

Proximity Switch - Fluid end: No ☐ Yes ☐

Proximity Switch - Gas end: No ☐ Yes ☐

Remote Charging Capability: No ☐ Yes ☐

Special Inspection Code approval: No ☐ Yes ☐

*If yes, specify:*

_____

Safety Rupture Disk Assm. No ☐ Yes ☐

*If yes, specify pressure (± 10%):*

_____

Linear Transducer? No ☐ Yes ☐

Corrosion Resistant: No ☐ Yes ☐

*If yes, specify:*

_____

Nickel Plated ☐

Chrome Plated ☐

Phenolic/Epoxy Coated ☐

Stainless Steel Construction ☐

Other Options:
*(Please specify)*

_____

_____

_____

Any Physical Dimension Limitations? No ☐ Yes ☐
*(i.e., height, length, weight-If yes, please note below)*

_____

_____

Questions, Comments, Other Information? _____

_____

_____

_____

_____

_____

_____

_____

Tobul Accumulator

**800.245.4167**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**Bamberg, SC 29003 USA**
**803.245.5111**
**803.245.2636 fax**

Houston Plant
**9618 West Tidwell Avenue**
**Houston, Texas 77041**

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**Bamberg, SC 29003 USA**
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**803.245.2636 fax**

Shanghai Office
**Suite 2624, 26/F**
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**333 Tian Yao Qiao Road,**
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**www.tobul.com**