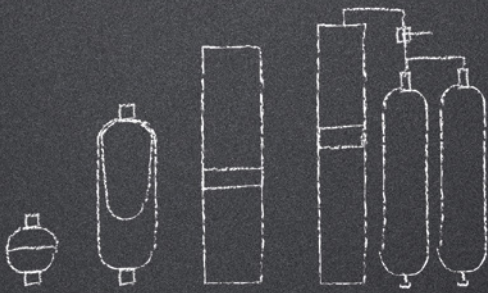
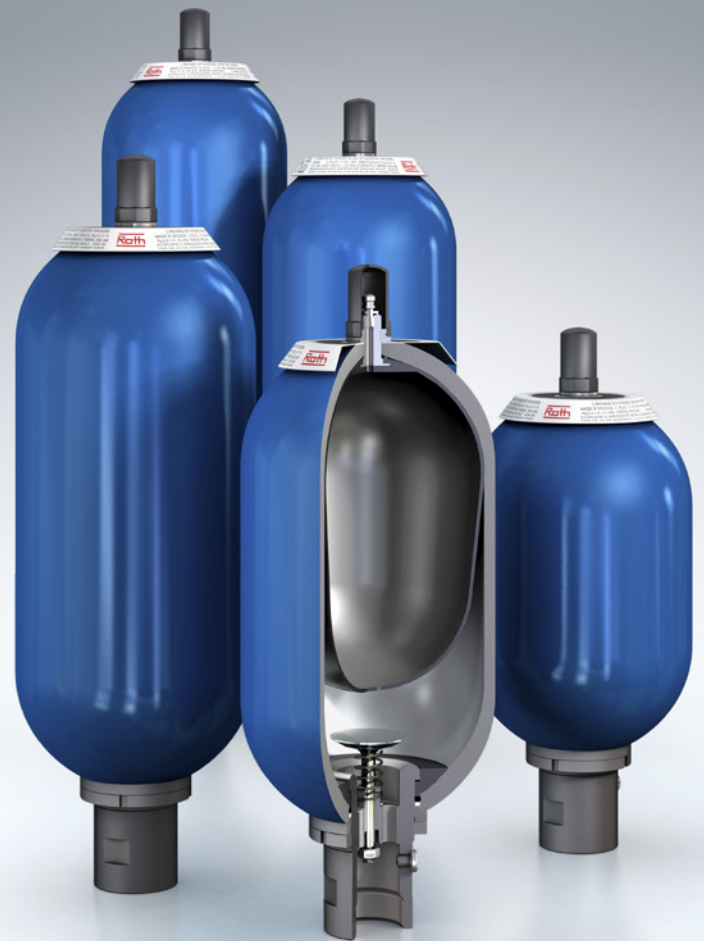


Accumulators

## Bladder Accumulators



### Technical Information Series CE + ASME



*excellent pressure solutions*

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## Construction and Description

### ■ General

 **BOLENZ & SCHÄFER** has been a leader in the area of accumulator technology for more than 60 years. As a specialist in hydraulic accumulator applications, it is our primary objective to develop efficient solutions in line with market needs. In accordance with the rebranding initiative of our parent company, Roth Industries – of which Bolenz & Schäfer has been a solid member for more than a quarter of a century – we are proud to continue our activities as Roth Hydraulics.

The **Roth bladder accumulator** enhances the product spectrum by a further innovative product. Cost optimised, low maintenance, practically wear resistant, durable, available in versions for special media and applications as well as suitable for use in extreme conditions – these are some of the product's distinguishing features. Roth hydraulic accumulators fulfil all applicable regulations and directives.

Accumulator adapters, safety and shut-off valve blocks along with other accessories can be found in our separate catalogue Accumulator Accessories.



**The application fields** of the Roth bladder accumulator are many and diverse. Amongst other applications, they can be used for:

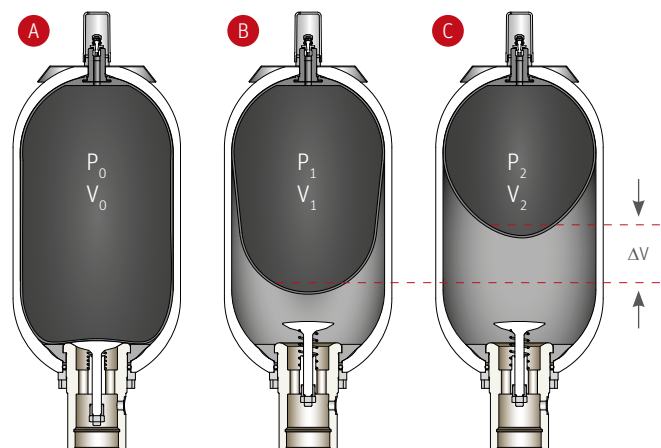
- > Energy storage
- > Pulsation damping
- > Volume compensation
- > Hydraulic springing
- > Shock absorption
- > Media transfer partition
- > Emergency operation

### ■ Function

Roth bladder accumulators enable the storage and release of hydraulic energy. As pressurised hydraulic fluid flows in at the oil port valve, the nitrogen within the accumulator bladder becomes compressed. Hydraulic energy is stored. When the pressure drops in the hydraulic system, the nitrogen gas and bladder expand and drive the hydraulic fluid out of the bladder accumulator back into the hydraulic system. Hydraulic energy is released. The bladder serves simultaneously as a media separator or transfer barrier.

#### The three basic settings of the bladder:

- A** The bladder is pre-charged with nitrogen. The fluid valve is closed and prevents escape from the bladder.
- B** Position at minimum working pressure. A small volume of fluid must remain between the bladder and fluid valve so that the bladder does not close the valve disc at each emptying.  $P_0$  therefore has to be less than  $P_1$ .
- C** Position at maximum working pressure. The volume change  $\Delta V$  between the position at minimum working position corresponds to the stored fluid volume.



$V_0$  = Total gas volume of the accumulator

$V_1$  = Gas volume in the bladder accumulator at  $P_1$

$V_2$  = Gas volume in the bladder accumulator at  $P_2$

$\Delta V$  = Dissipated or absorbed useful volume between  $P_1 / P_2$

$P_0$  = Pre-charge pressure of the bladder in the bladder accumulator

$P_1$  = Minimum working pressure

$P_2$  = Maximum working pressure

# Construction and Description

## Overview of Roth bladder accumulators

Overview of Roth bladder accumulators	
Volume	1 ... 57 l
Transport filling	approx. 1 bar
Operating pressure	max. 350 bar (420 bar)
Materials	Steel, special materials, stainless steel (on request)
Media	HFC, HLP, HFD ...
Temperature	-40 ... +80°C
Volume flow (Q <sub>max.</sub> )	max. 900 l/min
Installation position	preferably vertical to ... horizontal
Accumulator shell	sand blasted
	primer coated
	top coat/ special coating available
Oil/ Gas valve	Carbon steel
	Stainless steel, nickel
Fluid ports	G inside thread G1/2 - G2 SAE thread connections
	Flange connections available
	Special connections available
Bladder (elastomers)	NBR, TT-NBR, XTT-NBE, ECO, IIR, FKM, EPDM
Acceptances	DGR 2014/68/EU, ASME, ML China, NR13, EAC, GL, ABS, BV, DNV, Canada, CCS, LRS, RINA

### Gas filling

Only nitrogen of Class 4.0 is to be used, never oxygen or compressed air.

### Design pressure (see selection table)

The design pressure corresponds to the maximum permissible operating pressure (PS) and is the maximum setting pressure of safety equipment against excess pressure (safety valves, burst discs) at the same time.

We recommend operating the accumulators with a maximum pressure of 0.9 x PS to prevent safety equipment from responding.

### Operating temperature

Temperature range standard: -15° C to +80° C, different temperature ranges, e.g. -40° C to +80° C, available on request.

### Condition on delivery

Accumulator shell base-coated with universal priming colour RAL 5015, manufactured seamless, inside sand-blasted. Colour treatment and blasting or other surface coatings (e.g. galvanic zinc plating) are possible.

### Pressure fluids

Fluids of Group 2 according to DGR 2014/68/EU and nitrogen, or in relation to bladder elastomer and temperature range, according to data in the "Pressure fluids" table below. The oil purity class must be min. 19/17/14 (NAS 1638-KJ8) according to ISO 4406.

### Gas pre-charge pressure

To prevent the oil valve from closing at each oil extraction, the gas pre-charge pressure should not be higher than 0.9 x the maximum working pressure (P1) and not lower than 0.25 x the maximum working pressure (P2).

### Accumulator installation

To prevent damage to the bladder, a vertical accumulator assembly, with fluid connection below, is preferable. If the assembly site requires a horizontal mounting, the inside of the accumulator shell must be provided with the plastic coating specially developed by Roth Hydraulics. This special coating minimises abrasive wear between the accumulator inside wall and bladder.



### Note Operation and Maintenance

Please observe the information in the operating and maintenance instructions for this.

## Selection of pressure fluids

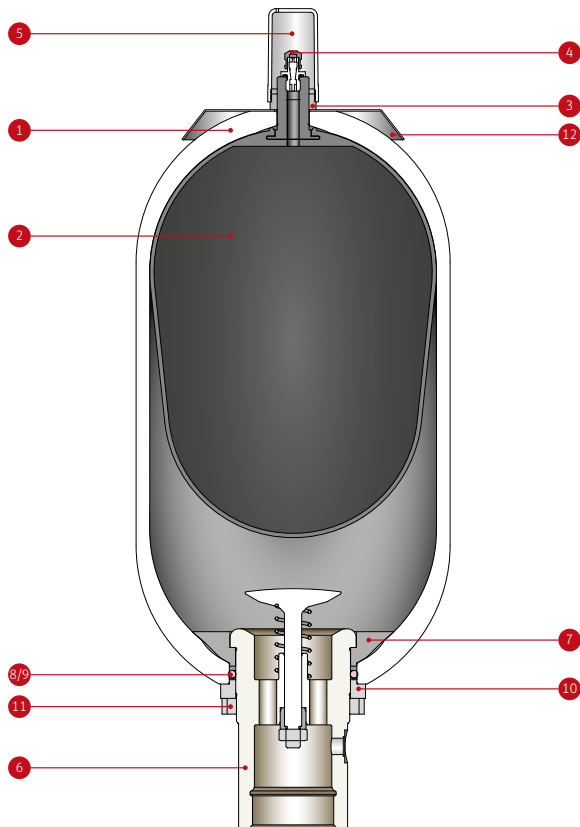
Fluid	Temperature range °C	Elastomer
... especially for low temperature range*	-32 ... +115	Hydrin C (ECO)
Fluids based on mineral oil*	-15 ... +90	NBR
	-28 ... +80	TT-NBR
	-40 ... +80	XTT-NBR
HFA, HFB*	+5 ... +55	NBR
HFC*	-15 ... +60	NBR
Fluids based on phosphate ester and some synthetic fluids*	-15 ... +120	Butyl (IIR)
Fluids based on phosphate ester*	-40 ... +120	Ethylene propylene diene (EPDM)
Hardly flammable and / or synthetic fluids*	-20 ... +140	Viton (FKM)

\*Fluid selections for low temperature ranges as well as for temperature applications below -20°C or above +80°C require consultation.

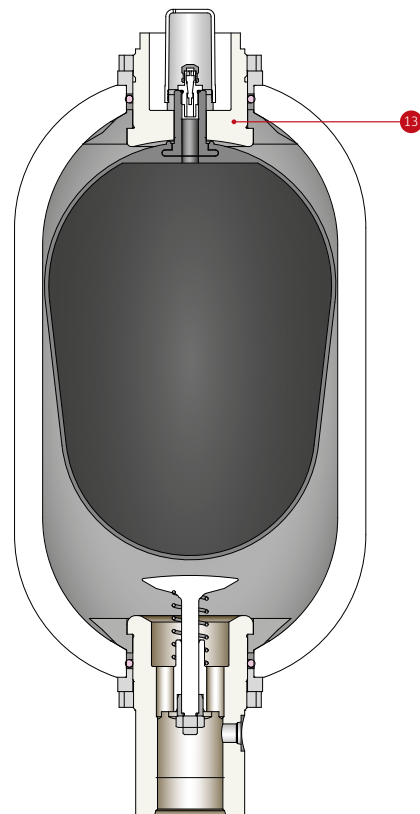
# Construction and Description

## ■ CE Series BLAK / ASME Series BLUAK

### Standard BLAK / BLUAK



### Special version BLUAK Top-Repairable



Item	Designation	Material
1	Accumulator shell	Steel
2	Elastomer bladder	NBR
3	Lock nut	Steel
4	Gas-side valve	Stainless steel
5	Protection cap	PA6
6	Oil-side valve	Steel
7	Separated ring	Steel / Elastomer

Item	Designation	Material
8	O-ring	NBR / FKM
9	Back-up ring	PTFE
10	Spacer ring	Steel
11	Slotted nut = Threaded ring	Steel
12	Type plate	Aluminium
13	Adapter	Steel

# Rules and regulations

## ■ Acceptance

Roth hydraulic accumulators are manufactured and approved for the European market in accordance with the "Pressure Equipment Directive".

Hydraulic accumulators according to Pressure Equipment Directive >1 L volume are provided with a CE mark and are supplied with a declaration of conformity and a corresponding operating manual.

The Pressure Equipment Directive is also accepted by many other countries besides the EU member states. Only some additional approval documentation may be required.

Countries such as Russia or China also require an approval, which Roth Hydraulics has.

Pressure vessel shipment to the USA must correspond to the American regulations, the ASME Code. Roth Hydraulics has been approved since 1981, according to ASME Code Section VIII Division 1; and has the longest experience with these regulations in Germany as a hydraulic accumulator manufacturer. Vessels with ASME acceptance are marked with the so-called "U-stamp" and supplied with a data report as acceptance documentation.

The scope of the ASME Code only covers pressure vessels and accumulators with an internal diameter greater than 6 inches.

The CE series BLAK can therefore be used for accumulator diameters less than 6 inches.

Vessels according to the ASME Code are also accepted in Canada. In Canada, an additional approval (Canadian Registration Number, CRN) is required for the relevant Destination province. The province or installation site must be indicated along with the order. Maritime applications form part of daily business at Roth Hydraulics and are hence routine procedures. A selection of the potential maritime acceptances can be found in the following table.

Roth Hydraulics has all important product and company approvals worldwide.

The following tables contain a selection of the most common acceptance variants. If your planned installation country or the required acceptance is not listed, please indicate this in plain text along with the enquiry.

## ■ Selection table

### Standard acceptances:

Country code	Countries	Approval regulation	Var. no.
EU	EU member states	Pressure Equipment Directive 2014/68/EU with CE mark	50
RUS	Russia	Pressure Equipment Directive 2014/68/EU + EAC TR-CU	520
VRC	China	Pressure Equipment Directive 2014/68/EU + ML (> 30 L)	534
VRC	China	Pressure Equipment Directive 2014/68/EU without ML (< 30 L)	
BR	Brazil	Pressure Equipment Directive 2014/68/EU + CE mark + NR 13 (Brazil)	515
USA	USA	ASME Code Sect. VIII Div. 1	15

### Special acceptances:

Country code	Countries	Approval regulation	Var. no.
CND	Canada	ASME Code + CRN (Canadian Registration No.) Approval depending on province – indicate province	29
ASME DOSH	Malaysia	ASME + DOSH Malaysia	61

### Maritime acceptance:

Country code	Countries	Approval regulation	Var. no.
CCS	Various countries	China Classification Society	537
ABS	Various countries	American Bureau of Shipping	510
LRS	Various countries	Lloyd's Register of Shipment	5
GL	Various countries	Germanischer Lloyd	41
RINA	Various countries	RINA	536
BV	Various countries	Bureau Veritas	506
DNV	Various countries	Det Norske Veritas	509

# Type Code BLAK

## CE Series BLAK

		Order designation				
Series	BL.. -	HF-	...-	...-	...-	
	▲	▲	▲	▲	▲	
	BLAK TYPE	High-Flow	Oil content [l]	max. operating pressure [bar]	Outside ø [cm]	
Material/Coating	...-	<ul style="list-style-type: none"> <li>C = (Standard) carbon steel</li> <li>N = Nickel plated on request</li> <li>X = Stainless steel on request</li> <li>V = (Special coating) carbon steel</li> <li>A = Special material on request</li> <li>K = *inside plastic coated</li> </ul>				
Bladder material	...-	<ul style="list-style-type: none"> <li>1 = (Standard) NBR</li> <li>2 = (Hydrin) ECO</li> <li>3 = (Low temperature) TT-NBR</li> <li>4 = (Butyl) IIR on request</li> <li>5 = (Viton) FKM</li> <li>6 = (Ethylene propylene diene) EPDM on request</li> </ul>				
Oil connection	...-	<ul style="list-style-type: none"> <li>G = (Standard) pipe thread (without adapter) ISO 228</li> <li>R = Pipe thread (with adapter) ISO 228</li> <li>L = Flange connection, SAE 3000</li> <li>H = Flange connection, SAE 6000</li> <li>M = Metric thread</li> <li>T = NPT</li> <li>S = Special thread (please also indicate in plain text)</li> </ul>				
Acceptance	...-	<ul style="list-style-type: none"> <li>50 = (Standard) Pressure Equipment Directive 2014/68/EU</li> <li>... = Others see: Acceptance selection table</li> </ul>				
Material of oil valve	...-	<ul style="list-style-type: none"> <li>C = (Standard) carbon steel</li> <li>P = Carbon steel zinc plated</li> <li>N = Carbon steel nickel plated</li> <li>X = Stainless steel</li> </ul>				
Material of gas valve	...-	<ul style="list-style-type: none"> <li>X = (Standard) stainless steel</li> <li>A = Special material (please also indicate in plain text)</li> </ul>				
PO pre-charge pressure	...	...			Filling according to customer request [bar]	

**Example: BLAK 50 - 330 - 22 - C+K -1- G - 50 - X - X - 30**

Product for order designation is:

Type:	BLAK
Oil content:	50 litre
Pressure:	330 bar
Outside ø:	22 cm
Material/Coating:	Carbon steel + inside plastic coated
Bladder material:	Standard (NBR)
Oil connection:	G2
Acceptance:	Pressure Equipment Directive
Material of oil valve:	Stainless steel
Material of gas valve:	Stainless steel
Pre-charge pressure as required by customer	30 bar

**\* inside**  
In the case of a plastic coated inside surface, please indicate "+K" in the order code (see example box "C+K").

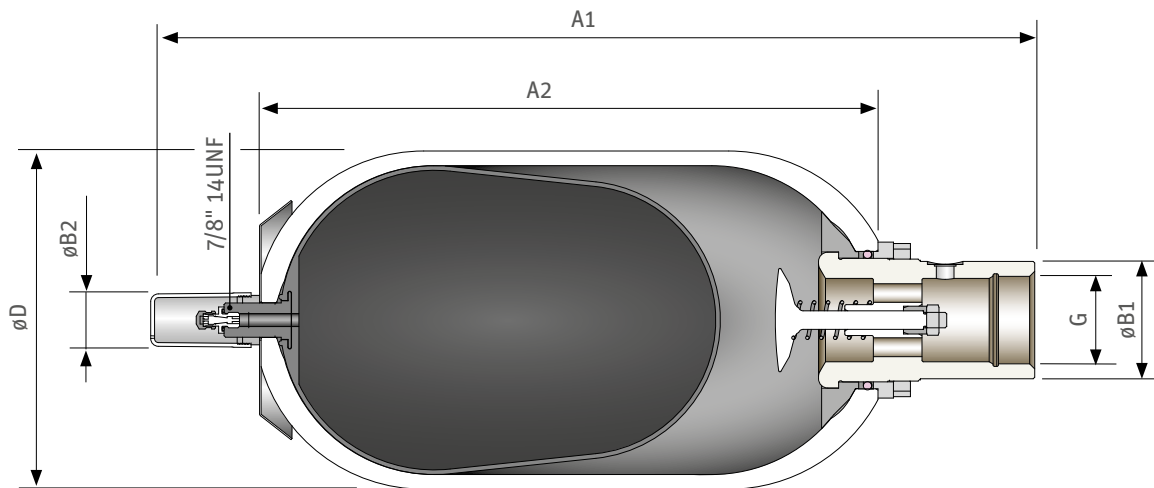
Please indicate the required thread size/connection nominal width along with this selection.

**Note:** The use of the type code generally ensures our ability to supply.

Diverse bladder accumulators with order numbers are listed on the following pages. These are only valid for the types described there. Please observe the corresponding specification!

# CE Series BLAK

## ■ CE Series BLAK 1 - 50 l



Gas volume [l]	Design pressure [bar]	Type/Order number	Note	Temperature range	Weight [Kg]	Dimensions						
						G	ø D	A1	A2	ø B1	ø B2	Q
							[mm]					[l/s]
1	350	BLAK 01-350-11,4 4204019650	only for BLAK ...-C-1-G-50-C-X	-15 ... +80°C	6	G1 1/4	114	338	202	53	35	7.5
2.5	350	BLAK 02.5-350-11,4 4204019639			10	G1 1/4	114	547	411	53	35	7.5
4	350	BLAK 04-350-16,8 4204019420			13	G1 1/4	168	421	287	53	35	7.5
5	350	BLAK 05-350-11,4 4204019638			16	G1 1/4	114	896	760	53	35	7.5
6	350	BLAK 06-350-16,8 4204019419			19	G1 1/4	168	551	416	53	35	7.5
10	330	BLAK 10-330-22 4204018514			30	G2	220	574	402	76	35	15
20	330	BLAK 20-330-22 4204018513			45	G2	220	884	712	76	35	15
24.5	330	BLAK 24.5-330-22 4204018512			54	G2	220	1019	847	76	35	15
32	330	BLAK 32-330-22 4204018511			80	G2	220	1404	1232	76	35	15
42	330	BLAK 42-330-22 4204018510			94	G2	220	1544	1372	76	35	15
50	330	BLAK 50-330-22 4204018509			108	G2	220	1919	1747	76	35	15

**Note:** The dimensions may vary slightly depending on the materials used and/or applied acceptances.  
In the event of an order, you will receive a binding drawing for approval for non-standard products.



# Type Code BLUAK

## ASME Series BLUAK / BLUAK Top-Repairable

Series	Order designation					
	BL..	T-	HF	...-	...-	...-
	▲	▲	▲	▲	▲	▲
	BLUAK TYPE	Top-Repairable	High-flow	Oil content [gal]	max. Operating pressure [psi]	Outside ø [cm]
Material/Coating	...-	C	= (Standard) carbon steel			
		N	= Nickel plated on request			
		X	= Stainless steel on request			
		V	= (Special coating) carbon steel			
		A	= Special material on request			
		K	= *inside plastic coated*			
Bladder material	...-	1	= (Standard) NBR			
		2	= (Hydrin) ECO			
		3	= (Low temperature) TT-NBR			
		4	= (Butyl) IIR on request			
		5	= (Viton) FKM			
		6	= (Ethylene propylene diene) EPDM on request			
Oil connection	...-	B	= (Standard) SAE (without adapter)			
		R	= Pipe thread (with adapter) ISO 228			
		L	= Flange connection, SAE 3000			
		H	= Flange connection, SAE 6000			
		M	= Metric thread			
		T	= NPT			
		S	= Special thread (please also indicate in plain text)			
		G	= Pipe thread (without adapter) ISO 228			
Acceptance	...-	15	= ASME Code Section VIII Division I			
		...	= Others see: Acceptance selection table			
Material oil valve	...-	C	= (Standard) carbon steel			
		P	= Carbon steel zinc plated			
		N	= Carbon steel nickel plated			
		X	= Stainless steel			
Material Gas valve	...-	X	= (Standard) stainless steel			
		A	= Special material (please also indicate in plain text)			
Gas connection	...-	E1	= Standard 7/8"-14 UNF-1A			
		E2	= Special version on request			
PO pre-charge pressure	...	...	= Filling according to customer indication [psi]			

**Example: BLUAK 5 - 5000 - 24,5 - C - 1- G - 15 - C - X - E1 - 30**

Product for order designation is:

Type:	BLUAK
Oil content:	5 gallons
Pressure:	5000 psi
Outside ø:	24.5 cm
Material/Coating:	Carbon steel
Bladder material:	Standard (NBR)
Oil connection:	G2
Acceptance:	ASME
Material of oil valve:	Carbon steel
Material of gas valve:	Stainless steel
Gas connection:	Standard 7/8"
Pre-charge pressure as required by customer	30 psi

**\* inside**  
In the case of a plastic coated inside surface, please indicate "+K" in the order code (see example box "C+K").

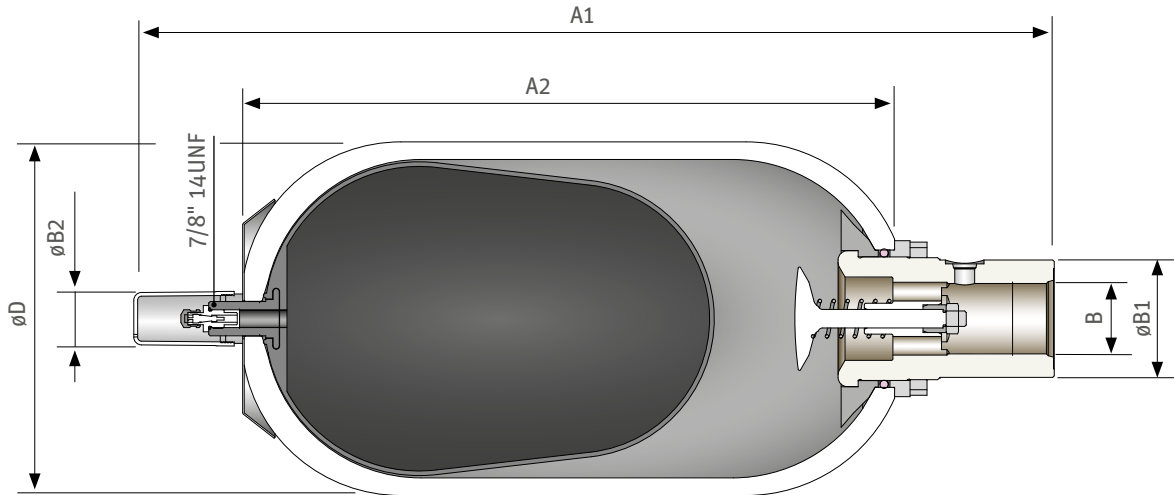
Please indicate the required thread size/connection nominal width along with this selection.

**Note:** The use of the type code generally ensures our ability to supply.

Diverse bladder accumulators with order numbers are listed on the following pages. These are only valid for the types described there. Please observe the corresponding specification!

# ASME Series BLUAK

## ASME series BLUAK 0,25 Gal to 15 Gal – 3000 psi and 4000 psi series

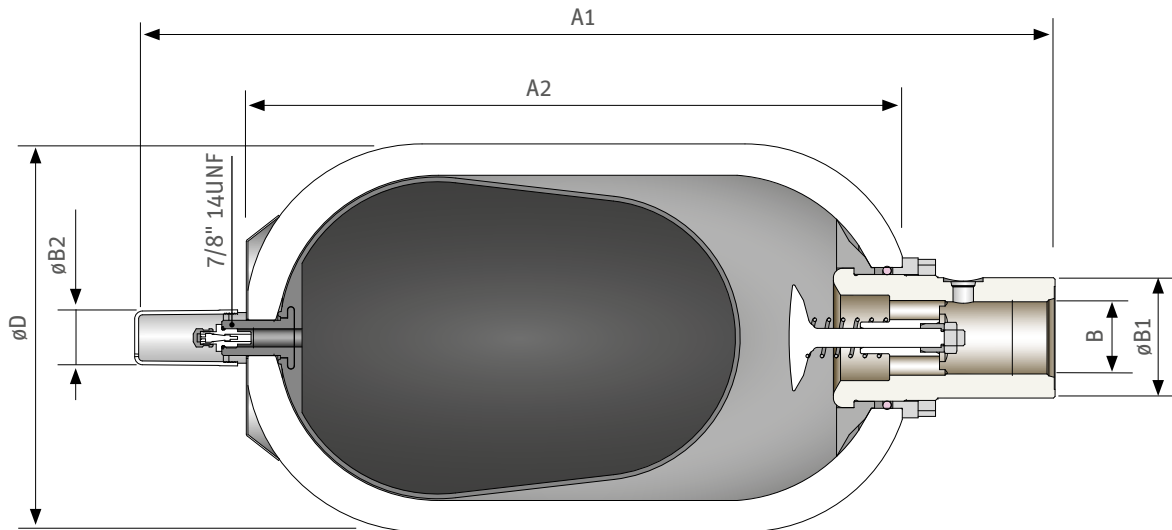


Gas volume [gal] / [l]	Design pressure [psi] / [bar]	Type/Order number	Note	Temperature range	Weight [lbs] / [kg]	Dimensions							
						B	ø D	A1	A2	ø B1	ø B2	Q	
						[inch] / [mm]					[gpm] / [l/s]		
0,25 1	3000 207	BLUAK 0,25-3000-11.4 4204028560	only for BLUAK ...-C-1-B-15-C-X-E1	5 ... 200°F / -15 ... +93° C	15.4 7	1 5/16"- 12	4.49" 114	12.17" 309	7.5" 190	1.65" 42	1.4" 35	79 5	
	4000 276	BLUAK 0,25-4000-11.4 4204030119			35.3 16	1 5/8"- 12	6.61" 168	16.81" 427	11.26" 286	2.28" 58	1.4" 35	119 7.5	
1 4	3000 207	BLUAK 01-3000-16.8 4204028561			83.8 38	1 7/8"- 12	9.01" 229	22.52" 572	15.63" 397	3" 76	1.4" 35	238 15	
	4000 276	BLUAK 01-4000-16.8 4204030165			134.5 61	1 7/8"- 12	9.01" 229	34.80" 884	27.91" 709	3" 76	1.4" 35	238 15	
2.5 10	3000 207	BLUAK 2.5-3000-22.9 4204028474			222.7 101	1 7/8"- 12	9.01" 229	55.91" 1420	49.02" 1245	3" 76	1.4" 35	238 15	
	4000 276	BLUAK 2.5-4000-22.9 4204030166			321.9 146	1 7/8"- 12	9.01" 229	78.94" 2005	72.03" 1830	3" 76	1.4" 35	238 15	
5 20	3000 207	BLUAK 5-3000-22.9 4204028475											
	4000 276	BLUAK 5-4000-22.9 4204030167											
10 32	3000 207	BLUAK 10-3000-22.9 4204028476											
	4000 276	BLUAK 10-4000-22.9 4204030168											
15 57	3000 207	BLUAK 15-3000-22.9 4204028477											
	4000 276	BLUAK 15-4000-22.9 4204030169											

**Note:** The dimensions may vary slightly depending on the materials used and/or applied acceptances. In the event of an order, you will receive a binding drawing for approval for non-standard products.

# ASME Series BLUAK

## ASME series BLUAK 2.5 Gal to 15 Gal – 5000 psi and 6000 psi series

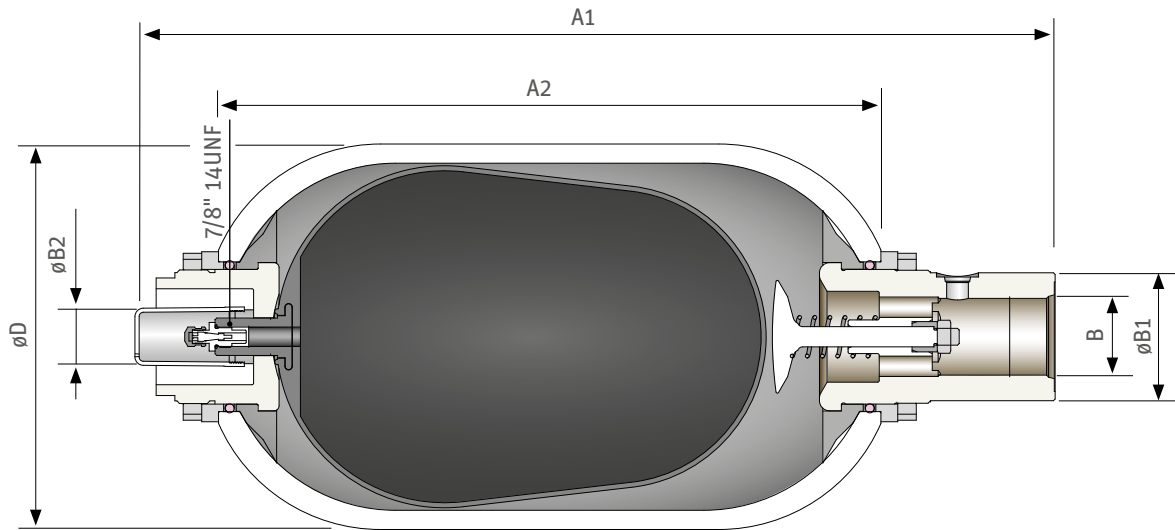


Gas volume [gal] / [l]	Design pressure [psi] / [bar]	Type/Order number	Note	Temperature range	Weight [lbs] / [kg]	Dimensions							
						B	ø D	A1	A2	ø B1	ø B2	Q	
						[inch] / [mm]					[gpm] / [l/s]		
2.5 10	5000 345	BLUAK 2.5-5000-24.5 <b>4204029089</b>	only for BLUAK ...-C-1-B-15-C-X-E1	5 ... 200°F / -15 ... +93° C	127.9 58	1 7/8"- 12	9.65" 245	22.87" 581	16.26" 413	3" 76	1.4" 35	238 15	
	6000 414	BLUAK 2.5-6000-24.5 <b>4204030170</b>			209.4 95	1 7/8"- 12	9.65" 245	34.88" 886	28.27" 718	3" 76	1.4" 35	238 15	
5 20	5000 345	BLUAK 5-5000-24.5 <b>4204029090</b>			354.9 161	1 7/8"- 12	9.65" 245	55.63" 1413	48.02" 1245	3" 76	1.4" 35	238 15	
	6000 414	BLUAK 5-6000-24.5 <b>4204030171</b>			545.9 234	1 7/8"- 12	9.65" 245	78.62" 1997	72.01" 1829	3" 76	1.4" 35	238 15	
10 32	5000 345	BLUAK 10-5000-24.5 <b>4204029091</b>											
	6000 414	BLUAK 10-6000-24.5 <b>4204030172</b>											
15 57	5000 345	BLUAK 15-5000-24.5 <b>4204029092</b>											
	6000 414	BLUAK 15-6000-24.5 <b>4204030173</b>											

**Note:** The dimensions may vary slightly depending on the materials used and/or applied acceptances. In the event of an order, you will receive a binding drawing for approval for non-standard products.

# ASME Series BLUAK Top-Repairable

## ASME series BLUAK-T – 2.5 Gal to 15 Gal – 3000 psi and 4000 psi series

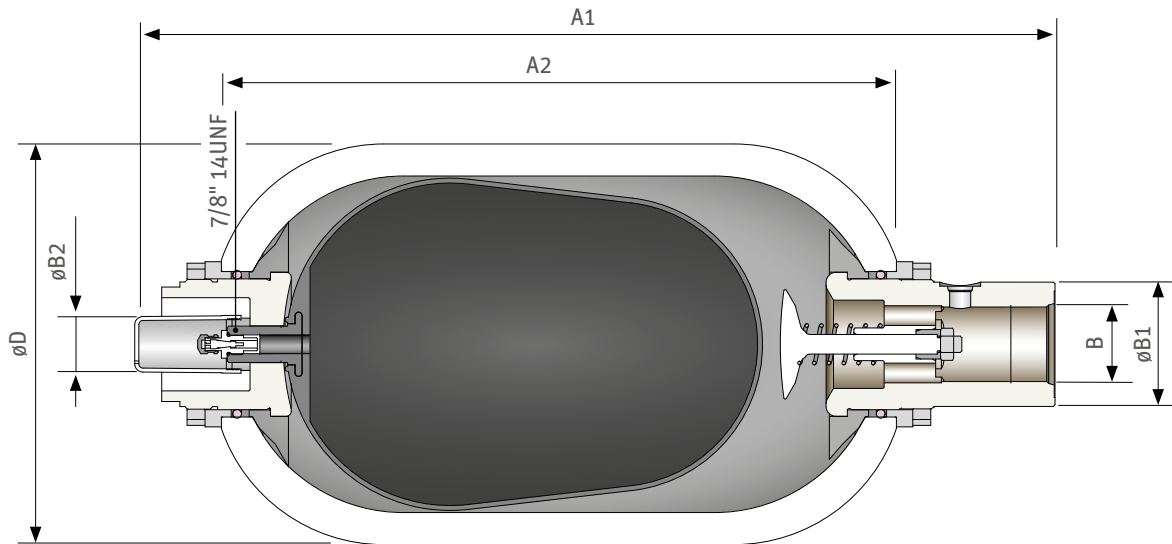


Gas volume [gal] / [l]	Design pressure [psi] / [bar]	Type/Order number	Note	Temperature range	Weight [lbs] / [kg]	Dimensions								
						B	ø D	A1	A2	ø B1	ø B2	Q		
						[inch] / [mm]					[gpm] / [l/s]			
2.5 10	3000 207	BLUAK-T-2.5-3000-22.9 <b>4204028493</b>	only for BLUAK ...-C-1-B-15-C-X-E1	5 ... 200°F / -15 ... +93° C	88.2 40	1 7/8"- 12	9.01" 229	21.54" 547	15.51" 394	3" 76	1.4" 35	238 15		
	4000 276	BLUAK-T-2.5-4000-22.9 <b>4204030174</b>												
5 20	3000 207	BLUAK-T-5-3000-22.9 <b>4204028494</b>					138.9 63	1 7/8"- 12	9.01" 229	33.54" 852	27.52" 699	3" 76	1.4" 35	238 15
	4000 276	BLUAK-T-5-4000-22.9 <b>4204030175</b>												
10 32	3000 207	BLUAK-T-10-3000-22.9 <b>4204028495</b>					224.9 102	1 7/8"- 12	9.01" 229	54.25" 1378	48.23" 1225	3" 76	1.4" 35	238 15
	4000 276	BLUAK-T-10-4000-22.9 <b>4204030176</b>												
15 57	3000 207	BLUAK-T-15-3000-22.9 <b>4204028496</b>					326.3 148	1 7/8"- 12	9.01" 229	77.89" 1981	71.92" 1825	3" 76	1.4" 35	238 15
	4000 276	BLUAK-T-15-4000-22.9 <b>4204030177</b>												

**Note:** The dimensions may vary slightly depending on the materials used and/or applied acceptances. In the event of an order, you will receive a binding drawing for approval for non-standard products.

# ASME Series BLUAK Top-Repairable

## ASME series BLUAK-T – 2.5 Gal to 15 Gal – 5000 psi and 6000 psi series



Gas volume [gal] / [l]	Design pressure [psi] / [bar]	Type/Order number	Note	Temperature range	Weight [lbs] / [kg]	Dimensions								
						B	ø D	A1	A2	ø B1	ø B2	Q		
						[inch] / [mm]					[gpm] / [l/s]			
2.5 10	5000 345	BLUAK-T-2.5-5000-24.5 4204028502	only for BLUAK ...-C-1-B-15-C-X-E1	5 ... 200°F / -15 ... +93° C	132.3 60	1 7/8"- 12	9.65" 245	22.17" 563	16.26" 413	3" 76	1.4" 35	238 15		
	6000 414	BLUAK-T-2.5-6000-24.5 4204030178												
5 20	5000 345	BLUAK-T-5-5000-24.5 4204028503					207.3 94	1 7/8"- 12	9.65" 245	34.17" 868	27.27" 718	3" 76	1.4" 35	238 15
	6000 414	BLUAK-T-5-6000-24.5 4204030179												
10 32	5000 345	BLUAK-T-10-5000-24.5 4204028504					332.9 151	1 7/8"- 12	9.65" 245	54.92" 1395	49.02" 1245	3" 76	1.4" 35	238 15
	6000 414	BLUAK-T-10-6000-24.5 4204030180												
15 57	5000 345	BLUAK-T-15-5000-24.5 4204028506					474 215	1 7/8"- 12	9.65" 245	77.91" 1979	72.01" 1828	3" 76	1.4" 35	238 15
	6000 414	BLUAK-T-15-6000-24.5 4204030181												

**Note:** The dimensions may vary slightly depending on the materials used and/or applied acceptances. In the event of an order, you will receive a binding drawing for approval for non-standard products.

# Calculation



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## ■ Accumulator Calculation Form

Accumulator calculation		
Working pressure [bar]	minimum	
	maximum	
Discharge volume [l]		
Discharge time [s]		
alternatively to discharge volume and discharge time, total volume of accumulator [l]		
Ambient temperature [°C]	minimum	
	maximum	
Medium temperature [°C]	minimum	
	maximum	
Medium	Fluid side	
	Gas side	
Material	Bladder	
	Accumulator	
Load alternation per week	Number	
Operating mode	Number of work shifts	
Acceptance	Installation country	
	Regulations	

### Description of application:

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Date

Company

Name

## Our strengths

### Your benefits

#### Innovative

- > Own product development
- > In-house technology centre for all relevant tests and inspections including: Burst and swell test bench, endurance test rig, cold chamber, salt spray test
- > Close collaboration with universities and institutes
- > Tested and proven design and simulation program for all types of hydraulic accumulator

#### Global

- > Worldwide production, assembly and service sites
- > Certified according to DIN EN ISO 9001:2015, DIN EN ISO 14001
- > Proximity to customers thanks to own representatives and extensive dealer network worldwide
- > International production approvals, including ASME Code, Russian Customs Union TR-CU, Korea KGS

#### Complete product portfolio

- > Extensive range of diaphragm, bladder and piston accumulators
- > Complete and tested accessories range, including for professional installation and for (accumulator) safety
- > Accumulator measuring and monitoring systems, mechanical or non-contact
- > Customised special solutions

A large, white, stylized version of the Roth Hydraulics logo, consisting of the word "Roth" in a bold, blocky font with horizontal lines above and below it, and the word "Hydraulics" in a similar bold, blocky font below "Roth".A close-up photograph of a person's hand, palm up, holding the large white logo from the previous block. The hand is positioned at the bottom left of the page, with the fingers slightly curled under the logo.



## Roth Hydraulics

### Accumulators

- > Diaphragm accumulators
- > Bladder accumulators
- > Piston accumulators

### Accumulator systems

- > Accumulator units
- > Monitoring systems
- > System accessories
- > Pressure vessels

### Special solutions

- > Spring accumulators
- > Damper systems
- > Rail hydraulics
- > Special accumulators

**Roth**  
Hydraulics



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