

## Bladder Surge Tanks

**Water hammer and surge protection for potable water, sea water and wastewater systems**

The bladder surge tank serves as an important component of combined surge protection systems protecting against both positive and negative pressure surges. The tank's internal flexible bladder separates the fluid from air that is pre-compressed between the metal tank housing and the bladder. This design prolongs the system's life span and reduces the need for maintenance.



### Features and Benefits

- Visual, Magnetic or Weight level reading accessories ensures full control and optimal operation of the bladder surge tank.
- Surge simulation and analysis – customer support from the early design stages of the project
- Full separation between liquid and air – prevents corrosion and eliminates the need for auxiliary air compression systems

### Operation Principles

#### **1. System layout**

Bernad's Bladder Surge tanks are available for vertical or horizontal installation.

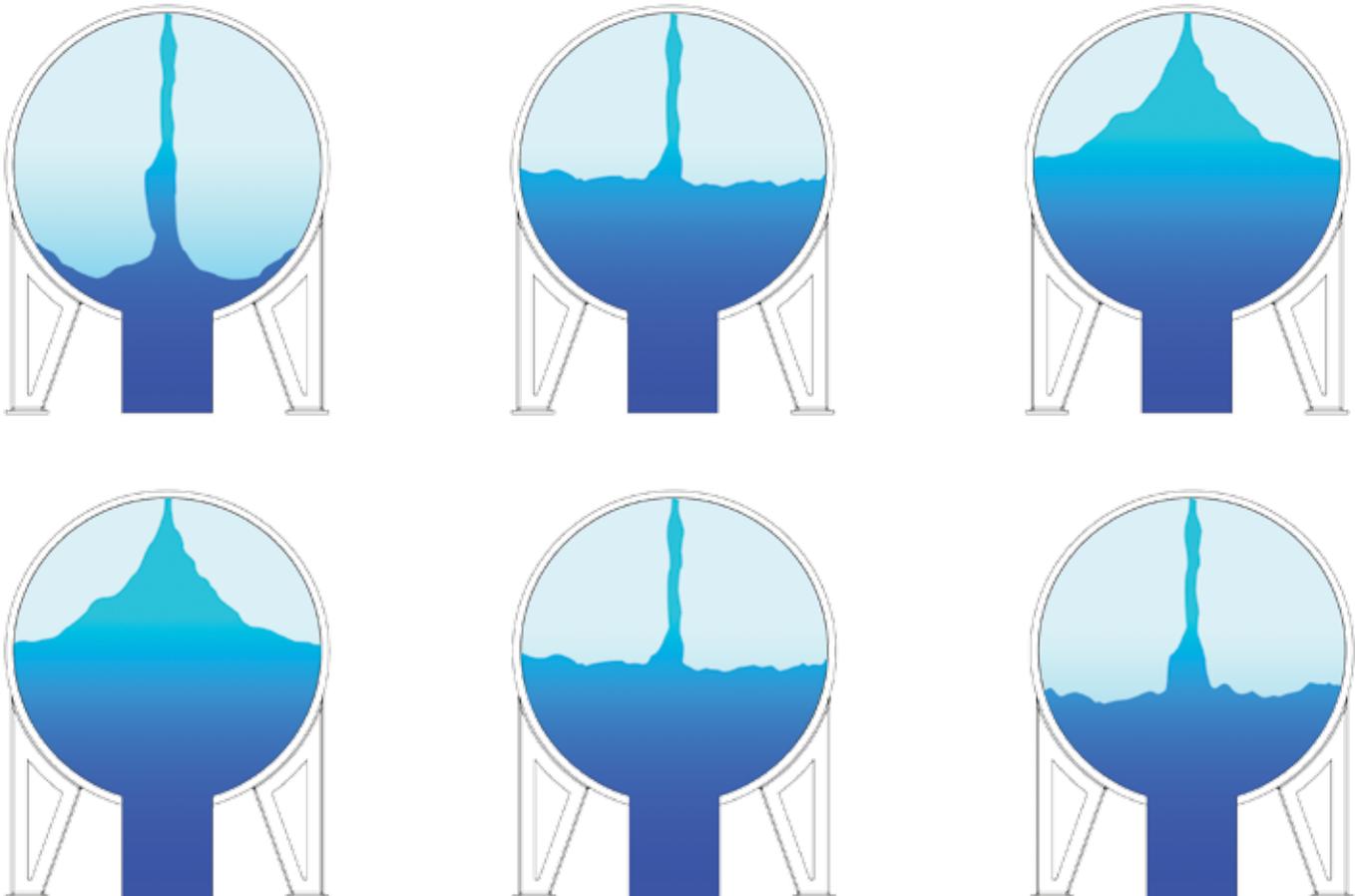
The steel tank contains a flexible bladder which is fixed to the tank's connection with the main pipe of the water system. The bladder shape is similar to the tank's shape so it can expand to the full capacity of the tank. Compressed air is confined between the bladder and the external tank's housing in pressure level compatible with the system requirements. The bladder's internal and external pressures are always equal; enabling inbound and outbound flows of water as needed.

#### **2. Operation upon Pump Start - Up**

When the pump starts the system pressure rises; water flows into the bladder, expand it and presses the air to the system's pressure level. This restrains the transient pressure increase and enables safe transit from static state to regular operation state.

#### **3. Operation upon Pump Stop**

A pump stop causes a pressure drop as the traveling column of water, with its inherent inertia, continues traveling along the pipe. At this stage severe vacuum conditions start to develop near the pump. The high air pressure in the tank pushes the water out of the bladder into the pipeline, preventing by this the vacuum conditions development and the risk of pipes collapse. When the water column depletes its inertia and starts to move backwards in the pump's direction the tank is filled again, so the compressed air absorbs the high pressure wave. The process oscillates till it completely stops.



### Technical Data

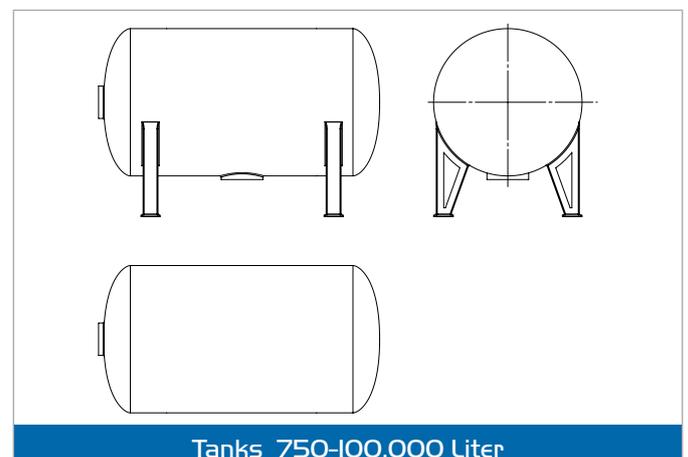
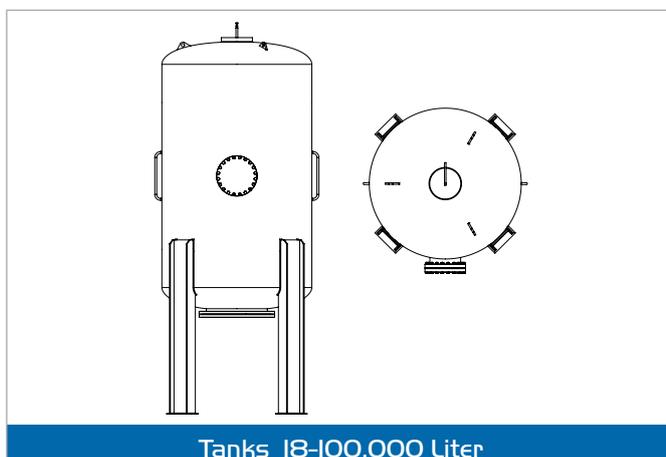
Capacity	Liter	Gallon
Fixed Size	18-2000	4.7-528
Custom Made	2000-100,000	528-26,420

Pressure Rating	BAR	PSI
	4,10,16,25,40,64,100	58,145,232,362,580,928,1450
Outlet Flange	DN25-DN1200 mm	1"-48"

Max Water Temperature				
Tank Volume		Bladder Type	Temperature	
Liter	Gallon		C°	F°
18-100	4.7-26.4	EPDM	110	230.0
200-500	52.8-132.1	EPDM	88	190.4
500-100,000	132.1- 26,420	Polyurethane	110	230.0

Packing		
Tank Volume		
Liter	Gallon	
≤ 2000	≤ 528.4	Pallets
> 2000	> 528.4	Cradle

**Standard Material:** Steel  
**Interchangeable Bladder:** Yes  
**Feet and ears for handling:** Included  
**Pre-inflation Valve:** Included for bladder pressure vessel

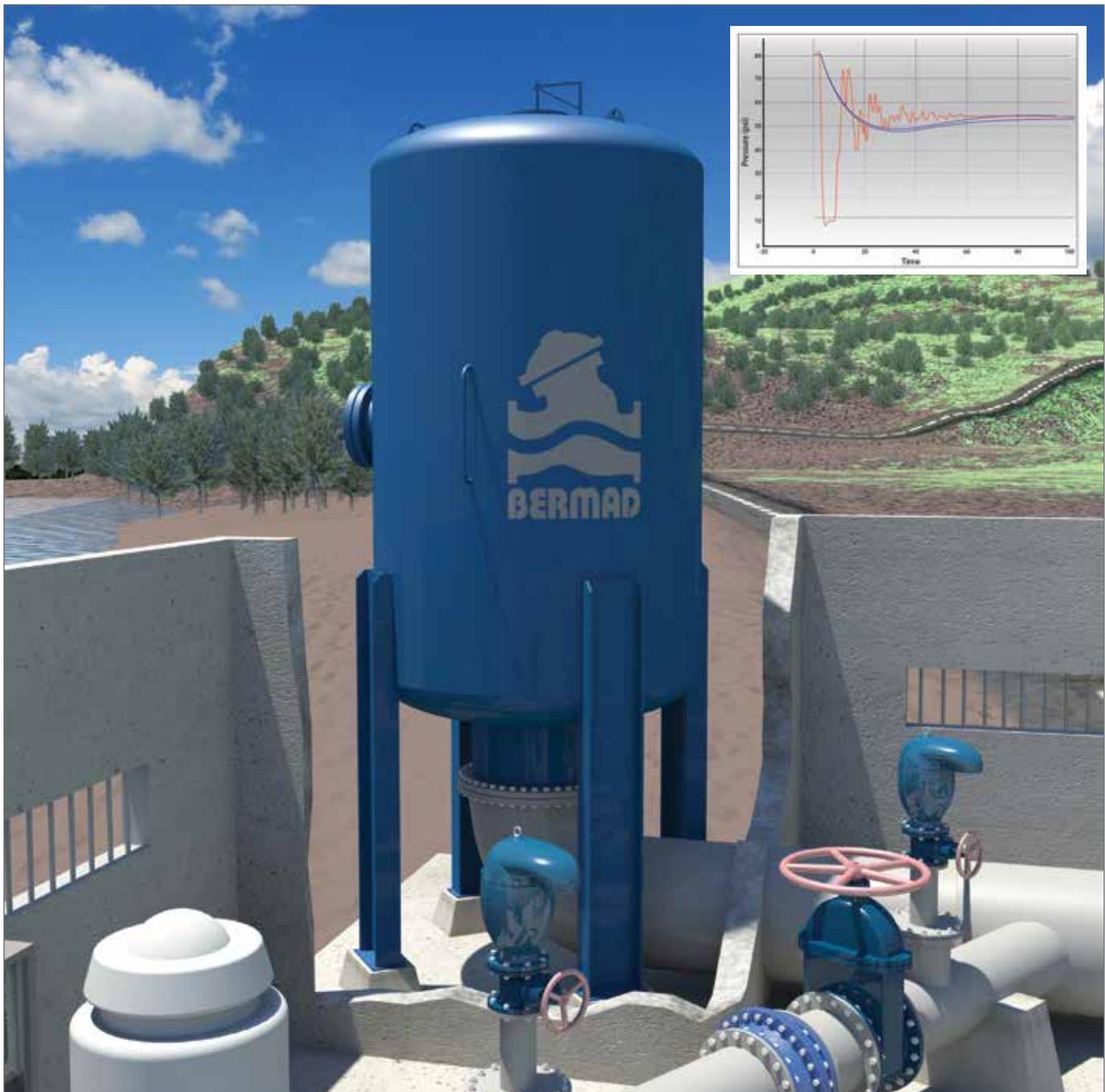


### Surge Analysis

#### Surge Tank Calculation

Performing surge analysis is crucial for determining the required tank volume and its optimal operation conditions in order to ensure safe operation during the various transient operation stages of the system.

BERMAD Engineers use the KYPipe Surge software, which is leading surge software, to offer its customers with engineering calculations of tank volumes required for optimal operation.





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