



## NEW Bladder Pump Design with Easy to Replace Bladder Cartridges

### Bladder Pump

Model 407

The **Solinst Bladder Pump** features a new design providing consistent, high-quality samples in all types of applications. It offers excellent performance and reliability. With Solinst Bladder Pumps, there is the assurance that there is no air/water contact during sampling. It meets the most rigorous US EPA standards for VOC groundwater monitoring.

The bladder guarantees that drive air or gas does not contact the sample, thus avoiding degassing or contamination. Solinst Bladder Pumps are rugged and long-lasting. Santoprene® bladders are ideal for dedication, however, the **new easy-to-replace bladder cartridges** are excellent for those who prefer to change bladders after each use. The bladder and intake filters are simply replaced in the field in just a few minutes—no special tools are required.

Excellent for either regular flow or low flow sampling, the stainless steel pumps can lift from depths up to 150 m (500 ft) below grade. The new PVC Bladder Pump operates up to 100 ft (30 m) below grade.

### Low Flow Purge and Sampling

Low flow groundwater sampling offers excellent quality samples by reducing turbulence. It also lowers purge volumes, thus reducing groundwater sampling time and disposal costs.

When using a Solinst 464 Electronic Pump Control Unit, the Solinst Bladder Pump can be adjusted to provide a continuous output of 100 ml/min or less. The use of a Flow-Through Cell System during low flow sampling allows the continuous analysis of purge water in-line as it flows, so groundwater sampling can begin as soon as the readings stabilize.

Packers are also available to further reduce groundwater purge volumes, speed up sampling times, and lower purge water disposal costs.



### Bladder Pump Features

**Santoprene Bladders:** Santoprene bladders are used for their chemical resistance and inert properties, making them suitable for harsh environments as well as potable water applications.

**Stainless Steel or Low Cost PVC:** 1.66" Ø (42 mm) and 1" Ø (25 mm) in 316 stainless steel. 1.66" Ø (42 mm) in PVC.

**Non-Vertical Applications:** Bladder Pumps operate effectively at almost any angle and can be placed under landfills, tailings, storage tanks or contaminant plumes.

**Leachate/Product Pumping:** Pneumatic drive Bladder Pumps are well suited for pumping contaminant liquids. Strong

solvents and corrosive chemicals can be easily and economically pumped.

**Survives Dry Pumping, Dirty Air and Sand:** Solinst bladders are not damaged by operation in sediment laden water, or in dry pumping conditions.

**Freeze Protection Kit:** Optional accessory available to prevent freezing in the groundwater sampling line.

### Benefits of Using Solinst Bladder Pumps

**Bladder:** Durable Santoprene bladders are ideal for dedication, however, **new bladder cartridges** make them extremely easy to replace.

**High Quality Samples:** Consistently accurate groundwater samples with excellent VOC sample integrity.

**Simplicity:** The controller, air compressor and flow-through cell can be easily transported by one person to any site. Hookup to the Bladder Pump is by barb fittings.

**Cost and Time Savings:** Reduced need for repeat sampling and shorter time required for each sampling round. Low purge volumes ensure rapid sampling. Purged water disposal costs are also decreased.

### Solinst Bladder Pumps

**Solinst Bladder Pumps** are manufactured from 316 stainless steel and have PTFE or 316 stainless steel check balls. The bladder is made from durable Santoprene with a Delrin® and acetal copolymer cartridge. The stainless steel Bladder Pump is ideal for most municipal, industrial and general environmental applications, especially where VOC analysis of the groundwater sample is important.

The new PVC Bladder Pump is more suitable for metals analysis and situations with highly corrosive liquids. It has PTFE check balls, a porous polyethylene screen, and a Santoprene bladder with a Delrin and acetal copolymer cartridge. The lower cost PVC Bladder Pump is a perfect choice for situations with a limited budget, but dedicated Bladder Pumps are preferred.

The standard pump body of the Solinst Bladder Pump is a convenient 1.66" dia. (42 mm) and comes in lengths of 2 ft and 4 ft (0.6 m and 1.2 m). Stainless Steel Bladder Pumps are also available in a 1" dia. (25 mm) for narrower applications and use in the Waterloo Multilevel System. (See Model 401 Data Sheet.)

### Portable Bladder Pumps

Portable Bladder Pump systems are available for less frequent sampling and to allow access to multiple monitoring wells, even in remote locations.

Portable Bladder Pumps are supplied on a free-standing reel. The rugged systems are very convenient and easy to transport. The barb and compression tubing fittings on the reels and controller allow quick set-up in the field. Use a Solinst Model 103 Tag Line to lower and support the pump in the well (see Model 103 Data Sheet).



*Solinst Bladder Pumps available in Stainless Steel 1" and 1.66" (25 mm and 42 mm) and PVC 1.66" (42 mm)*



*1" (25 mm) Stainless Steel Bladder Pump  
on Free-standing Reel*



*Well Caps for Dedicated  
Bladder Pumps*

## Dedicated Well Caps

Dedicated well caps slip easily onto 2" dia. (50 mm) wells. Adaptors to fit 4" dia. (100 mm) wells are also available. They have quick-connect fittings for the drive and sample tubing.



*Groundwater Sampling with a Dedicated Bladder Pump using Portable, Rugged, Easy-to-use, Compressor and Controller*

## Dedicated Systems

For long-term groundwater monitoring, it is always best to dedicate Bladder Pumps. Dedication avoids cross-contamination and saves time without decontaminating between sampling events. There is also the assurance of no air/water contact during sampling and the confidence that no cross-contamination will occur from using portable equipment.

Solinst well caps are designed for ease of use. The vented caps have a quick-connect attachment for the controller unit/

air supply. Fittings are provided for both 1/4" OD (6 mm) and 3/8" OD (9 mm) tubing. Each cap comes with a 3 ft (0.9 m) length of discharge line, which can be easily replaced as needed.

There is an access hole for water level monitoring to fit a Solinst Model 101 Water Level Meter or Levelogger. An eyebolt is provided for a pump support cable, a Solinst Levelogger suspension line (see Model 3001 Data Sheet), or another device.



## Use the New Solinst Bladder Pumps without the Bladder

An advantage of the Bladder Pump is the ability to also use it without a bladder. This allows you to continue sampling if you are in the field with no bladder replacements. Simply operate it like a Double Valve Pump (DVP).



Model 464 Electronic Control Unit  
(125 psi and 250 psi Models)

## Pump Controllers

The **464 Electronic Pump Control Unit** is available in 125 or 250 psi versions. It uses 4 AA alkaline batteries that last up to 100 hours of normal use. You can also operate these Controllers manually if your batteries run out in the field, using only a compressed gas source. It has automatic preset sample modes from low through high flow settings. In addition, up to 99 user-created flow rates can be saved in FRAM memory. The Controller allows faster purge rates and precise low-flow control to ensure a representative sample at 100 ml/min or less when sampling for VOCs.

These convenient Controllers are rugged, dependable, and suitable for all environments. Quick-connect fittings allow instant attachment to dedicated well caps, portable reel units, and an air compressor or compressed gas source.



12 Volt Compressor

## 12V Oil-Less Air Compressor

The **Solinst 12 Volt Compressor** is lightweight (21 lbs (9.5 kg)), compact, and ideal for field use, especially low-flow applications of less than 30 m (100 ft) depths.

The compressor uses a 12-volt DC power source, such as a car or truck battery, and comes with alligator clips. It operates at up to 150 psi and is equipped with a 2 US gallon (7.6 L) air tank rated to 175 psi.



Replaceable Bladder Cartridges

## Easy Decontamination or Replacement

**Solinst Bladder Pumps** are easy to decontaminate. Everything is very accessible. The tubing may simply be flushed or it is easily replaced.

The Bladder Pump is quick to disassemble and the bladders and screens are simple to replace in the field. No tools required.

## Tubing

The standard tubing is 1/4" (6 mm) single line or 1/4" (6 mm) OD dual skip-bonded LDPE. PTFE-lined LDPE and other tubing sizes are also available.

Solinst provides dedicated systems with individual drive and sample lines so that the cost of replacing the sample line is minimized. Portable systems are provided with 1/4" (6 mm) OD dual skip-bonded tubing for ease of operation.



*Some Tubing Options*

## Filters and Packers

Stainless Steel Bladder Pumps come complete with a 50 mesh intake filter over the sample inlet, while PVC Bladder Pumps come with a polyethylene screen. These filters are straightforward to replace. If required, Solinst also supplies Model 860 Disposable In-line Filters for use on the sample discharge tube. They are adaptable to fit many sizes of tubing. (See Model 860 Data Sheet.)

Model 800 Low-Pressure Packers can be used with Solinst Bladder Pumps to minimize purge times by reducing purge volumes. This reduces the cost of water disposal and labour. Packers are available in single point or straddle packer designs and in sizes to fit 2" (50 mm) to 5" (127 mm) diameter wells. (See Model 800 Data Sheet.)



*860 Disposable In-line Filter*



*Model 800 Packers  
3.9" and 1.8" (99 mm and 46 mm)*

## Higher Groundwater Sampling Flow Rates

When larger groundwater purge volumes are required, Solinst Bladder Pumps can deliver flow rates up to 1.5 L/min.

Alternatively, a Solinst Stainless Steel Double Valve Pump (DVP) is an option. These pneumatic drive DVPs can provide higher flow rates and sample from greater depths than most Bladder Pumps.

Flow rates vary with the depth of the pump below the surface, depth below water level, size of the drive and sample tubing, drive and vent cycle times, gas pressure applied and aquifer recharge.

Flow rates of the Solinst Bladder Pump and the DVP compare favourably with published data for similar types and sizes of pumps under similar conditions.

For example:

1.66" x 2 ft (42 mm x 610 mm) Bladder Pump at 100 psi, with 1/4" OD drive line and 3/8" OD sample line; 50 ft (15 m) below grade with 25 ft (7.5 m) below water level gives 1.5 L/min.



## Bladder Pump Operation

When a Solinst Bladder Pump is lowered into a well, hydrostatic pressure allows formation water to enter the central Santoprene chamber (the bladder) through the inlet filter and fill to a static level.

When compressed air or gas is applied to the drive line, it pressurizes the space around the bladder, causing it to collapse and pushing the water up into the sample line.

Check valves ensure that no water flows back down through the pump or into the formation.

When compressed air or gas is vented (released), more formation water enters the bladder. When the pressure is reapplied, the fresh formation water is pushed towards the surface.

The pressure/vent cycles are repeated, providing a steady flow of water up the sample line without stripping volatiles from the sample. Due to the low flow rates and gentle pumping action, turbidity is minimized.

Thus, a high-quality VOC groundwater sample is obtained.