



## Bladder Pump

Model 407

The Solinst Bladder Pump allows 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 ensures that drive air or gas does not contact the sample, thus avoiding degassing or contamination of the sample. Solinst Bladder Pumps are rugged and long lasting. Teflon® bladders are ideal for dedication, while less expensive polyethylene bladders are available for those that prefer to change bladders after each use. Bladders and intake filters are easily replaced in the field in just a few minutes. No special tools required.

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

### Low Flow Purge and Sampling

Low flow sampling offers excellent quality samples by reducing turbulence. It also reduces purge volumes, and thus sampling time and disposal costs. When using a Solinst Model 464 Electronic Pump Control Unit, the Solinst Bladder Pump can be adjusted to provide continuous output of 100 ml/min. or less.

Use of a Flow-Through Cell System during low flow sampling, allows the continuous analysis of purge water, in-line, as it flows, so that sampling can begin as soon as the readings stabilize.

Packers are also available to further reduce purge volumes and to speed sampling times.

### Features

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

**Leachate/Product Pumping:** Pneumatic drive 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 sample line.

### Benefits

**High Quality Samples:** Consistently accurate 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 pump is by compression fittings.

**Cost Savings:** Reduced need for repeat sampling and shorter time required for each sampling round. Low purge volumes ensure rapid sampling.

**Bladders:** Durable Teflon bladders are ideal for dedication. Inexpensive polyethylene is also available.

## The Solinst Bladder Pump

Solinst Bladder Pumps are manufactured from 316 stainless steel and have Teflon check balls. The bladder most frequently used is Teflon, however polyethylene bladders are also available. This is the ideal sampling pump for most types of municipal, industrial and general environmental applications, especially where VOC analysis of the sample is important.

For metals analysis and situations with highly corrosive liquids, the PVC Bladder Pump is more suitable. It has Teflon check balls, a porous polyethylene screen and may have either a Teflon or a polyethylene bladder. The low cost of the PVC pump also makes this a perfect choice for situations where there is a limited budget, but dedicated bladder pumps would be preferred.

The pump body of the standard 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). 1" dia. (25 mm) bladder pumps are also available for narrower applications and for use in the Waterloo Multilevel System. (See Model 401 Data Sheet.)

## Portable Bladder Pumps

For less frequent sampling, and to allow access to multiple monitoring wells, even in remote locations, portable bladder pump systems are available.

They may be supplied on a free-standing reel, or mounted on a cart with the tubing and pump controller. The rugged systems are very convenient and easy to transport. Tubing fittings on the reels and controller are compression fittings, allowing quick set up in the field. The Solinst Model 103 Tag Line can be used to lower and support the pump in the well (see Model 103 Data Sheet).



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

Well Caps for Dedicated Pumps

## Dedicated Well Caps

The 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.



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

## Dedicated Systems

For long term monitoring it is always best to dedicate bladder pumps. This avoids cross-contamination and saves time without the need to decontaminate between sampling events. There is the assurance of no air/water contact during sampling, and the confidence that no cross-contamination will occur from the use of portable equipment.

Solinst well caps are designed for ease of use. The vented PVC 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 is easily replaced, as required.

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

## Converts Easily to Pneumatic DVP

The 1.66" dia. (42 mm) by 2 ft (0.6 m) Stainless Steel Bladder Pump (42 x 610 mm) utilizes most of the same parts as the pneumatic drive Solinst 1.66" Double Valve Pump (DVP). The DVP can operate from greater depths and provide higher flow rates. Conversion from a Solinst Bladder Pump to a DVP and back again is quick and easy (approx. 2 min.) and requires no tools.



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

## Pump Controllers

The Model 464 Electronic Pump Control Unit is available in 125 psi or 250 psi versions, and uses 4 AA alkaline batteries that last up to 100 hours of normal use. These Controllers can also be operated 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 to an air compressor or compressed gas source.



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

## 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 100 ft (30 m) depths.

The compressor operates using 12 volt DC power source, such as a car or truck vehicle battery, and comes with alligator clips. The compressor operates at up to 125 psi and is equipped with a 2 US gallon (7.6 L) air tank which is rated to 150 psi.



12 Volt Compressor

## Easy Decon or Disposable Polyethylene

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

The pump is quick to disassemble and the bladders and screens are simple to replace in the field. No tools required. Inexpensive polyethylene bladders can be quickly replaced to suit regulatory requirements.

## Tubing

The standard tubing is 1/4" (6 mm) single line or 1/4" (6 mm) OD dual skip-bonded LDPE. Teflon-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. Dedicated systems can come pre-assembled to the length you need, at no extra charge. Portable systems are provided with 1/4" (6 mm) dual skip-bonded tubing for ease of operation.

## Filters and Packers

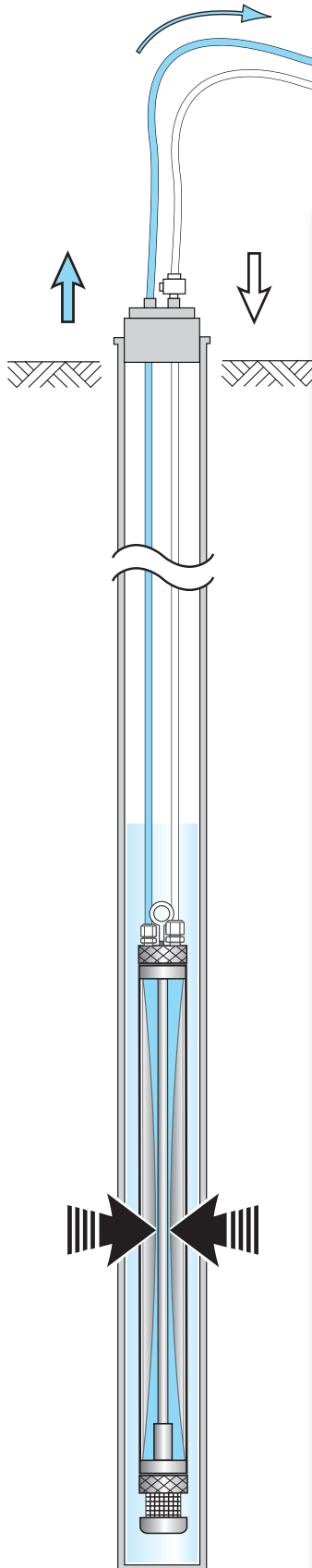
Stainless Steel Bladder Pumps come complete with a 50 mesh intake filter over the sample inlet. These filters are very easy to replace. If required, Solinst also supplies disposable in-line filters which are used on the sample discharge tube. They are adaptable to fit many sizes of tubing.

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) dia. wells. (See Model 800 Data Sheet.)



Model 800 Packers  
3.7" and 1.8" (94 mm and 46 mm)





## Bladder Pump Operation

When a Solinst Bladder Pump is lowered into a well, hydrostatic pressure allows formation water to enter the central Teflon chamber (the bladder) through the inlet filter, and fill to 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 pushes 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 up towards the surface.

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

Thus a high quality VOC groundwater sample is obtained.

## Higher Flow Rates

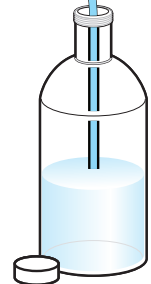
When larger purge volumes are required, Solinst Bladder Pumps can deliver flow rates up to 1.5 L/min.

Alternatively a simple conversion kit can be used to quickly turn a Stainless Steel Bladder Pump into a Solinst Double Valve Pump (DVP). These pneumatic drive DVPs can provide higher flow rates and sample from greater depths than most bladder pumps.

Flow rates vary with depth of pump below surface, depth below water level, size of 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:

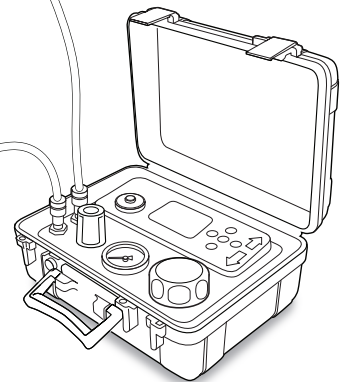
1.66" x 2 ft (42 mm x 610 mm) Bladder Pump at 100 psi, with 1/4" OD drive line and 3/8" OD sample line; 50 ft (15 m) below grade with 25 ft (7.5 m) below water level gives 1.5 L/min.



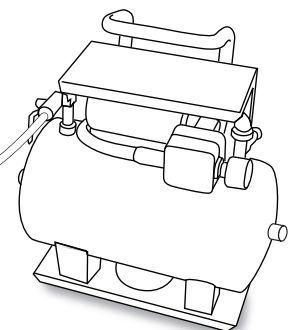
Sample Bottle

High quality VOC samples can be obtained, as the drive gas never comes in contact with the sample.

Model 464 Pump Control Unit



The Model 464 controls the amount of drive gas applied to the Pump, using preset or customized settings.



12 Volt Compressor

The 12V Compressor is ideal for low flow sampling applications to 100 ft (30 m).