

GROUNDWATER SAMPLING MANUAL DEVICES

Introduction - Bailers

Bailers - Disposable

Bailers - Reusable

Bailer Accessories

Other Samplers

The purpose of groundwater sampling is to retrieve a sample that is representative of the in-situ chemical characteristics of water in the formation.

An introduction to Bailers

What is a bailer?

Most bailers consist of some form of tubing with a one-way check valve at the bottom. Water in a tank or groundwater well will fill the bailer when it is submersed. On retrieving the bailer, the check valve closes containing a sample of the contents of the well or tank. Bailers come made from various materials (polyethylene, Teflon, stainless steel, acrylic), lengths (from 30cms to 180cms), widths (19mm to 90mm) and with numerous features like weighted, unweighted, single check-valve, double check valve, controlled flow bottom, etc. Even with the advent of automated groundwater purge/sampling systems, the bailer remains a popular sampling tool. Despite the apparent simplicity of the bailer, it is one of the most difficult tools to use for representative groundwater sample collection. As with other activities in groundwater monitoring, bailer use should be separated into the practical aspects of sampling and the technical objectives of sample collection.

When to use a bailer

The bailer is useful as a sample collection device if the well is first purged using a less disturbing method (e.g. portable pump), when the well is slow to recover or when there is very little stagnant water to be removed prior to sample collection.

Advantages

Bailers offer several practical advantages over other sampling equipment:

- Simple construction, reliable operation
- Does not require electric or pneumatic power
- One person operation
- Extremely portable
- Relatively easy to clean and maintain
- Inexpensive

Disadvantages

The greatest problem associated with bailer use is the purging activity. Monitoring wells that must be purged of several standing volumes of water require the bailer to be introduced to the well



numerous times. This repeated intrusion into the well increases the potential for "drag down" contamination.

Further, when a bailer is repeatedly dropped down the well such that it impacts the water surface, two problems can develop.

First, the impact of the bailer on the water surface creates shock waves that reverberate down the water column. This loosens fine particles in the formation, encouraging them to migrate into the well, making metals filtration more time-consuming and difficult.

Secondly, the impact of the bailer on the water surface creates a splash that breaks water into small droplets that are exposed to atmospheric conditions. That contributes to loss of dissolved gasses leading to altered sample chemistry. Target constituents that are vulnerable to such change are metals, alkalinity and volatile organic compounds.

Similarly, when the bailer is lifted from the well, water adhering to the outer surface of the bailer body drips to the surface. Those droplets which will later be sampled, are exposed to the biasing conditions of the air above the water column.

Five reasons to use disposables

(1) Cost Effective

Disposable Bailers are much cheaper than conventional ones. Further why have your money tied up in expensive conventional bailers when you can buy disposable bailers as and when you need them.

(2) Accurate Samples

Residual contaminants can pollute your samples and have extreme consequences on the outcome of your results.

Ensure the highest accuracy by eliminating cross-contamination with disposable bailers. Each unit is decontaminated after manufacture by washing and rinsing and then individually packed and sealed.

(3) Time Effective

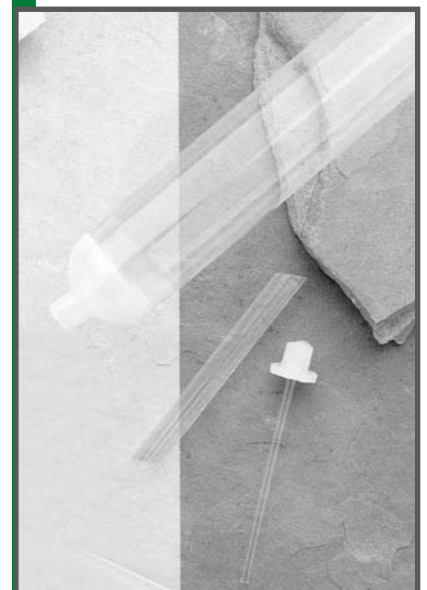
Eliminates time wasted on decontaminating re-useable bailers. No more field decon time.

(4) Equipment Damage

Save your expensive reusable bailers from permanent damage that can occur when it is exposed to high concentrations of contaminants.

(5) Employee health and safety

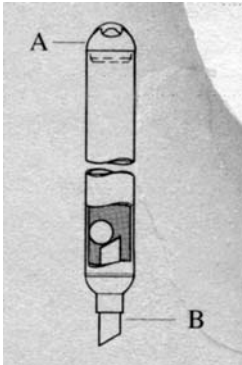
Employee exposure to toxic substances during decon pose a health risk due to cumulative effects in the body.



TYPES OF DISPOSABLE BAILERS

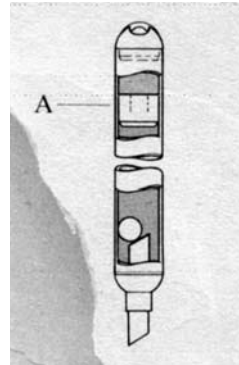
Single Check Valve

Includes a dome design polyethylene top (A) to avoid hang ups during bailer retrieval and retain the ball for top emptying. Dome Design bottom avoids hang ups when lowering the bailer. Available in 20, 38 and 75mm OD.



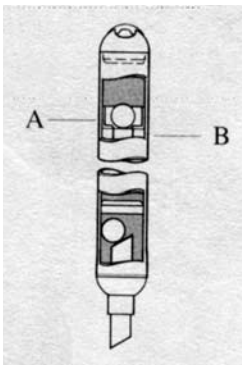
Single Check Weighted

Combines all the features of the Single Check Valve Bailer with a polyethylene coated weight (A) to allow sample extrusion from any well depth. Available in 20, 38 and 75mm OD.



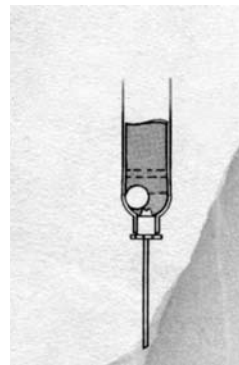
Double Check

Combines all the features of the Single Check Bailer with a second check valve (A) and a polyethylene coated weight (B) for sample extraction from any well depth. The second check valve isolates sample as the bailer is removed from the well. Available in 38mm OD only.



VOC Removal Device

Disposable VOC Sampler uses a unique design that allows sample transfer to VOA vials without loss of VOC's. Provides a slow sample flow for transfer to VOA vials.

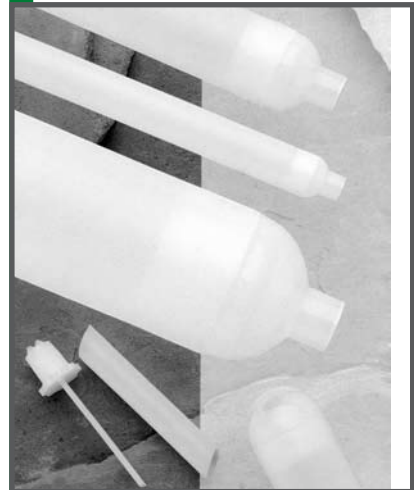


VTECH Bailers

VTech manufacture a wide range of disposable bailers from standard single check bailers to double check and weighted in various sizes. Polyethylene (HDPE) material and FEP material.

Benefits

- Wide range of diameter sizes and lengths
- Domed ends for no hang-ups down the well



Ordering Information

VOS91946SR	VTECH PE bailer 38 x 914mm Individually or box 24
VOS91946SWR	VTECH PE weighted bailer(s), 38 x 914mm Individually or box 24
VOSPE75SR	VTECH PE bailer 19 x 914mm Individually or box 24
VOSPE75SWR	VTECH PE weighted bailer, 19 x 914mm Individually or box 24
VOSSST-36-021W	VTECH VOC Removal Device, Box of 24
VOSPE3SR	Vtech weighted FEP bailer 38x914mm (box of 12)
VOSSST-36-021W	Vtech weighted FEP bailer 38x914mm (box of 12)
VOSSST-36-021	Vtech FEP bailer 38x914mm (box of 12)
VOSSST-36-021	Vtech FEP bailer 38x914mm (box of 12)

BULK DISCOUNTS AVAILABLE

Clear-View Disposable PVC Bailers

Clear-View PVC bailers are economically priced and perfect to assist in field sampling that may require visual inspection of the sample taken. Specially designed tops allow samples to be poured accurately, with little or no splashing.

The 38mm bailers feature a 16mm opening allowing for large volumes to rapidly fill the bailer with minimal disturbance to the sample.

Features

- Material is clear to assist in field sampling that may require visual inspection of the sample taken. (Actually see the product sampled from ground water remediation wells and fuel tanks, for example).
- PVC naturally sinks in water due to its specific gravity, relative to water. No weights to restrict flow of sample entering and exiting bailer.
- PVC is very rigid, stays straight, not bending or distorting under normal care.
- Quality materials:
 - Tubing - Virgin medical grade Poly Vinyl Chloride. (Same medical grade PVC resin used in the manufacturing of catheters, for treatment of medical patents.)
 - Tops and Bottoms - ABS
 - Ball - High grade PVC material
- Specially Designed Top:
 - Allows samples to be poured accurately, with little or no splashing
 - Strong rigid tethering attachment for secure fastening of bailer rope
 - Each part is press fitted and double welded, to assist in the bonding of tube to top device
- Specially Designed Bottoms:
 - Redesigned ball seat helps to deter sticking of ball, with out sample loss, between ball and device.
- Large 16.5mm opening allows for large volumes of product to rapidly fill the bailer with minimal disturbance to the sample. Also speeds up sampling and or purge time, thus saving money.
 - Each part is press fitted and welded, for little or no leaking between tube and bottom device.

Tested and approved

Recently the Manufacturer has conducted the most extensive spike test available, under method 8260B and 8270. Results on the PVC were equal to polyethylene, in all areas recognized. Furthermore, the time where the disposable bailer comes in contact with the sample is not long enough to cause any adverse reaction, thus resulting in no cross contamination issue.



Ordering Information

ESPCV153 Clear-View PVC Bailer, 38 x 914mm

ESPCV703 Clear View PVC Bailer, 18 x 914mm

ESPCV463 Clear View PVC Bailer, 12 x 914mm

Available individually or box of 24

ESPCVSED VOC Removal Device, Polyethylene, Box of 24

Teflon Reusable Bailers

QED Norwell® Bailers

The Norwell family of products includes a complete set of mix-and-match bailer components that are ideal in either dedicated or portable applications. Norwell bailers have become the sampling device of choice because of their highly innovative and exceptionally functional designs.

Ordering Information

48mm (1-7/8") dia. Bailer

QED36274	Norwell bailer, 350cc standard top and bottom
QED36275	Norwell bailer, 1050cc standard top and bottom
QED36276	Norwell bailer, 350cc, point source top and standard bottom, Teflon
QED36277	Norwell bailer, 1050cc point source top and standard bottom
QED35388	Norwell bailer, 350cc standard top and bottom, bottom-emptying
QED35389	Norwell Bailer, 1050cc standard top and bottom, bottom emptying
QED35380	Norwell bailer, 350cc point source top and bottom, bottom emptying
QED35393	Norwell bailer, 1050cc point source top and bottom, bottom emptying

Narrow Diameter Bailers

QED35505	Norwell bailer, 180cc standard bailer, 19mm x 900mm
QED35506	Norwell bailer, 80cc standard bailer, 25mm x 300mm
QED35507	Norwell bailer, 240cc standard bailer 25mm x 900mm

Components for

48mm (1-7/8") dia. Bailer

QED35395	350cc extension tube
QED35366	1050cc bailer extension tube
QED35367	Bailer extension coupling
QED35396	Standard top
QED35368	Bailer point source top
QED35397	Standard bottom, poppet style
QED35384	Norwell bottom emptying check assembly
QED36231	Standard bottom, ball style

Stainless Steel Reusable Bailers

Dormer Series

The Dormer series stainless steel bailers are Australian made. They have a screw on bottom check-valve to allow cleaning of the bailer interior. The top is a welded loop.

Monoflex

Monoflex stainless steel bailers are made of Type 304 Stainless Steel and are nearly as chemically resistant as Teflon®. Stainless steel bailers are designed for durability and are easy to decontaminate.

Stainless Steel Bailers are designed for "chemical" inertness and durability, however if you're sampling for metals then best to use a teflon or PVC bailer. It is not recommended to use a stainless steel "metal bailer" when sampling metals.



Monoflex SS Bailer

Ordering Information

EEQDB4510SSR	Open Top Standard 45 mm x 1m
EEQDB3810SSR	Open Top Standard 38mm x 1m
EEQDB4510SSRPS	Point source bailer 45mm x 1m
EEQDB4510SSR2B	Standard SS Bailer 42mm x 915mm
MFXTS053	Standard SS Bailer 13mm x 915mm
MFXTS153	Standard SS Bailer 27mm x 915mm
BME224601	Bailer brush for 38-50 mm bailers, 1m long
EEKBC50HD	PVC carry case, threaded end cap, 50mm x 1m

PVC Reusable Bailers

The White PVC bailers are the lowest cost type of reusable bailer. PVC bailers are extensively used for sampling in most sampling conditions.

White PVC Bailer

The Monoflex regular bailer has an open top and a single check valve at the bottom. Use it for purging and sampling.

Clear PVC Bailers

The Monoflex standard clear PVC bailer has an open top and a single check valve at the bottom. Used for purging and sampling, when you need to view the sample.



Ordering Information

Clear Bailers

MFXTPT153	Bailer PVC Transparent 27 x 920mm
MXTP162	Bailer PVC Transparent 42 x 600mm
MFXTPT163	Bailer PVC Transparent 42 x 980mm
MFXTPT352	Bailer PVC Transparent 89 x 600mm
MFXTPT353	Bailer PVC Transparent 89 x 920mm

White Bailers

MFXTPO843	Bailer PVC white 21 x 914mm
MFXTPO153	Bailer PVC white 27 x 920mm
MFXTPO133	Bailer PVC white 33.4 x 920mm
MFXTPO163	Bailer PVC white 42 x 920mm

PVC Point Source Bailers

A point source (or double check) bailer has a check valve at each end of the bailer allowing the capture of a grab sample from a discrete depth under water. As the bailer is lowered down through the water, the water washes through the bailer. However, when the bailer is stopped and pulled up, the two check valves close and prevent any further water entering the bailer, capturing the water from the point where the descent was stopped.

Point source bailers are available in Clear or White PVC. The removable top and bottom make cleaning the bailer quick and easy.



Ordering Information

- MFxBPWD1.66x36** PVC Point Source Bailer, 42mm x 914mm, White
- MFxBPCD1.66x36** PVC Point Source Bailer, 42mm x 914mm, Clear
- Other available diameters**
18mm, 22mm, 27mm, 34mm, 61mm, 89mm

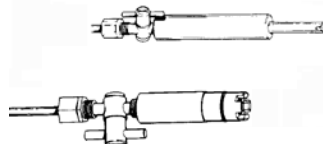
PVC Bottom Emptying Devices

For Monoflex reusable bailers
Monflex manufacture bottom emptying devices (with or without tap) to allow emptying of the bailer contents through the lower ball check without loss or contamination. The tap is useful if the sampling program requires multiple small sample containers to be filled. The devices are made of PVC in sizes to fit MF Bailers.

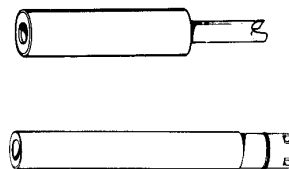
Teflon® Bottom Emptying Devices

For Monoflex reusable bailers
Monoflex provide bottom emptying devices (with or without tap) to allow emptying of the bailer contents through the lower ball check without loss or contamination. The tap is useful if the sampling program requires multiple small sample containers to be filled. The devices are made of Teflon or PVC in sizes to fit Timco Bailers.

With Tap



Without Tap



Bailer Dia.	PVC w/out Tap	PVC with Tap
21mm	MFXTPB84	MFXTPTB84
27mm	MFXTPB15	MFXTPTB15
33mm	MFXTPB13	MFXTPTB13
42mm	MFXTPB16	MFXTPTB16
89mm	MFXTPB35	MFXTPTB35

Bailer Dia.	Teflon w/out Tap	Teflon with Tap
20mm	MFXTB07	MFXTTB07
27mm	MFXTB15	MFXTTB15
35mm	MFXTB13	MFXTTB13
42mm	MFXTB16	MFXTTB16

Clear-View Disposable Hydrocarbon-Only Bailers

Bailers can be used to sample and even remove free floating product on the surface of groundwater. Free product sampling using standard bailers for this purpose may not be always possible, and in the limited situations where they are, the samples are not a true representation.

From the Clear-View bailer manufacturer come the CV-H series of disposable PVC bailers. The CH-H bailers have an inlet the same diameter as the bailer body hence it cuts an accurate core diameter through the free product layer. They are low cost bailers used to purge product only out of a well. Similar to the other Clear-View bailers, the CV-H bailers are low in cost and lower still in bulk quantities.

These bailers have a ball whose specific gravity is in between water and product. Hence it lets any water drain out, yet retains any product.



Ordering Information

- ESPCV153H** Hydrocarbon only disposable bailer, 38mm x 920mm
- Available individually or box 24

VTech Bailer Twine

Lab test results show the lowest leachout compared to other tested twine.

The prewound, disposable nylon twine eliminates cross-contamination. Available in 30m and 90m lengths. Extremely strong with 70kg break strength. Comes in handy cardboard hub cartridges that mount easily on the VTech Bailer Reel.



Other Twine

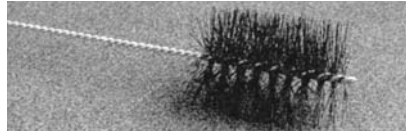
Also available from EnviroEquip are a range of stainless steel flexible cables, PVC coated steel wire and nylon poly twines.

Ordering Information

VOSTW100R	Nylon Bailer Twine, 30m Individually or Box 24
VOSTW300R	Nylon Bailer Twine, 90m Individually or Box 15
ARP0004250	Poly Twine, 4mm dia 250m roll
ERM167231	SS Cable, 2.4mm dia Available per metre

Bailer Brush

This nylon brush is perfect to ensure complete decontamination of bailers. The brush is 64.5mm in diameter and 76.2mm long with a 914.4mm wire handle.



Ordering Information

BME224601 Bailer Brush for cleaning reusable bailers

Storage & Retrieval Reels

Made of tough weather resistant polyethylene, this reel is an ideal way to retrieve and store cable/rope. Maximum capacity of 65m of polyrope, 160m of twine, or 100m SS cable. Comes with built-in stand.

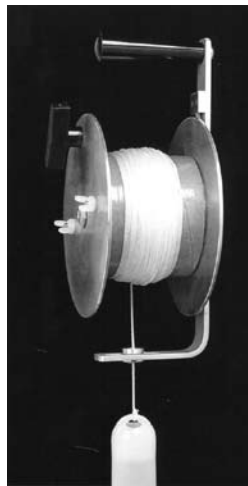


Ordering Information

ERMEZREEL Storage/Retrieval Reels

VTech Bailer Reels

The VTech Bailer retrieval system is an easy yet cost-effective way to speed up sampling whilst eliminating cross contamination. It features a sturdy reel refillable with VTech bailer twine rolls. The unit features a sturdy 18cm diameter reel with free-spin preventer that makes bailing and sampling faster and easier. Top handle is easy to hold while winding or releasing.



Ordering Information

VOSTWRR VTech Bailer Retrieval Reel

Bailer Carry Case

- Protect your reusable bailer in a handy case
- Add life to your expensive bailers
- Rugged PVC cases keep your bailers clean and scratch free
- Provide an ideal decontamination vessel
- Screw-on end cap for easy access
- Long enough to store accessories like bottom emptying devices

Made of PVC with threaded cap on one end, these bailer carrying cases are essential for transporting and storing expensive reusable bailers, especially in rugged field conditions.



Ordering Information

EKBC50HD Carrying case for up to 45mm OD bailers

HydraSleeve™ No-Purge Sampler

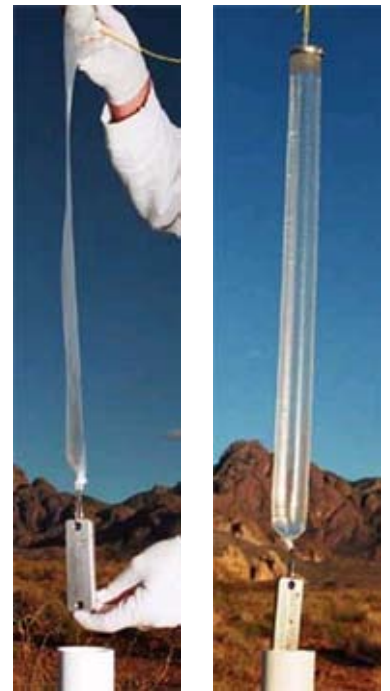
The HydraSleeve is used in place of purging and low-flow sampling methods in groundwater monitoring wells to obtain representative, real time, discrete interval sample of ALL compounds under natural groundwater flow conditions.

The HydraSleeve is effective for sampling slow recharge wells, for monitoring interfaces, and for concentration profiling. Simply lower the empty sampler to the desired interval, let the well return to undisturbed conditions, and pull the sampler through the sample zone.

Features & Benefits

- Low displacement
- Flexible, allowing you to sample crooked or constricted wells
- Self-sealing inlet valve
- Cost Saving - HydraSleeve™ generates no purge water for disposal and requires no expensive equipment
- Sample Slow Recharge Wells- Lower turbidity than purge and sample. Its slim cross section minimizes disturbance
- Fast and Easy - HydraSleeve™ collects samples in less than fifteen minutes and cuts field time by half or more. No decontamination. No special training or tools required. It comes in a small, convenient package.
- Sample Discrete and Multiple Intervals - Secure several HydraSleeve samplers to a single tether and obtain concentration profiles.

User should allow sufficient time for well to return to equilibrium prior to sampling.



Ordering Information

- EONGSH110** HydraSleeve Sampler 45mmx762mm 500mL
- EONGSH220** HydraSleeve Sampler 64mmx762mm 1.6L
- EONGSH130** HydraSleeve Sampler 45mmx914mm 1.25L
- EONGSH140** HydraSleeve Sampler 45mmx1220mm 1.7L
- EONGSW311** Stainless Steel Weight (reusable)
- EONFSF135** Snap Connectors (reusable)
- EONFSR110** Handheld Reel & Spool (reusable)
- EONFSR111** Extra Spool (reusable)
- EONFSR270** Spool (304m) 3mm braided Poly Rope

Equilibrator™ Passive Diffusion Sampler

The Equilibrator™ Passive Diffusion Sampler (PDS or PDB) is used in place of purging and low-flow sampling methods in groundwater monitoring wells to obtain representative, discrete interval samples of Volatile Organic Compounds under natural groundwater flow conditions. Simply fill the sampler with deionized water, install one or more PDBs in the zone(s) of interest and return at the next sample event to collect samples and replace samplers.

The Equilibrator™ is also used in surface water and in stream bed sediments and embankments to identify and monitor contaminant discharge areas.

Why use the Equilibrator™?

Reduce sampling cost by eliminating field time spent purging and the cost of purge-water disposal.

No expensive, complicated, or bulky equipment to purchase, maintain, or mobilize. Obtain depth-specific concentration profiles. Reduce sampling error and improve repeatability.

Equilibrator™ design features

Built-in suspension handle, attaches readily to suspension tether. Semi-permeable LDPE membrane holds deionized water and allows transmission of VOCs into sampler. Easy emptying methods; puncture with VOC "straw" or remove plug & pour. Filling port for field, lab, or factory filling

Required Components

- Equilibrator samplers, one per sample interval
- Deionized water to fill samplers
- Fill kit (1 per deployment team, reusable)
- Tether/suspension cord (1 per well, reusable)
- Stainless steel weight (1 per well, reusable)
- Cable ties to attach PDBs



Ordering Information

EONGSD200	Equilibrator Diffusion Sampler (45mm x 457mm) 350ml
EONGSW311	Stainless Steel Weight (reusable)
EONGSW312	Extra Heavy Weight, 20 oz. Stainless Steel, w/ Eyebolt (reusable)
EONGSD310	Hanger Stainless Steel (reusable)
EONGSD307	Fill Kit for standard Equilibrator
EONFSF135	Snap Connectors (reusable)
EONFSR110	Handheld Reel & Spool (reusable)
EONFSR111	Extra Spool (reusable)
EONFSR270	Spool (304m) 3mm braided Poly Rope

Solinst Model 425 Discrete Interval Sampler

Model 425 is a stainless steel sampler, with LDPE tubing mounted on a convenient reel. Discrete interval sampling is ideal for obtaining truly representative water samples from below floating product layers or for obtaining samples of the product itself. Can also be used to profile open bodies of water and boreholes, and to collect samples from distinct levels or points of inflow.

The sampler is pressurized when lowered and upon retrieval, to prevent water mixing at different levels.

Advantages

- High quality samples
- Sample has not been pumped through tubing
- No mixing of water from different levels
- Minimal disturbance of the water
- Easy disassembly for decontamination
- Avoids purging and disposal of purge water
- Easy operation and transportation



Ordering Information

SOL100401	Solinst Model 425, 25 mm x 600 mm Sampler with Sample release device
SOL101857	Solinst Model 425, 50 mm x 600 mm sampler with Sample release device
SOL105264	Solinst Model 425, 42 mm x 600 mm Sampler with Sample release device and in line check valve
SOL105191	Solinst Model 425T, 42 mm x 600 mm Sampler with Sample release device and in line check valve, Transportable vessel

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Visit us online at: www.thermofisher.com.au

New Zealand: For customer service, call 0800-933-966

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