



PRODUCT INFO:

PISTON SAMPLER :

The Piston Sampler is used to take undisturbed samples from water-saturated soils like marine mud & silty sand. It operates on the same principle as the fisherman's bait pump. That is, you push down on the outer tube simultaneously as you pull up on the piston. The piston is held in position while the tube is removed from the hole.

We manufacture the Piston Samplers from Stainless Steel tube in diameters of 50mm, 62mm, 75mm & 100mm with lengths to suit your requirements. The Piston Sampler comes in two main types, the *surface* type and the *down hole* type.

The *surface* type is for sampling from the surface level down to the length of the sampler in one operation. It comes with a moveable casing clamp that allows the operator to add body weight to assist with the insertion and it also acts as a handle for the removal of the sampler tube from the hole. The *surface* type also comes with a removable pulley mounted to the top of the sampler to help pull the piston up via a rope (in most cases the top of the sampler is above your head at the start of the sampling). Pulling on the rope through the pulley also adds down force to the sampler. The sample is removed by either pushing the piston with loose extension rods (or a dowel) or by removing the piston and shaking the sample out. We supply a 300mm long sleeve to catch the sample in or it can be expelled onto trays or clear plastic tubing (not supplied).

The *down hole* type is designed to be used where the watertable (saturated soil) is below ground level. A hole is augured down to the watertable and the piston sampler is connected to the extension rods and a rope is connected to the piston. The piston sampler is inserted using down force on the extension rods at the same time as the piston is pulled up via the rope. Some operators use a pulley (supplied) connected to the T-handle above their heads.

When the sampler is full the rope is tied off to the T-handle and the sampler is removed using the T-handle to pull up on. The removal of the sample is done by holding the sampler with the T-handle attached and pushing the piston via the fixed steel rod. The piston cannot be removed through the top because of the welded extension rod connection. Re-sampling deeper in the same hole can be achieved providing the hole has not collapsed. Collapsing can be prevented using casing. Extension rods, T-handles, rope and pulleys are supplied separately to suit depths and customer requirements.

Helpful Hints:

- Keep the piston and inside the sampler clean and lubricated using a product compatible with your sampling requirements e.g. vegetable oil or soapy water.
- Thick plastic mud's can sometimes be sampled with the piston removed. Sampling with the piston in the retracted (up) position causes air locks.
- Pulling on the wet rope hurts the hands so using a stick or T-handle or a mountain climbers sliding rope grip does help.
- The Surface type is definitely a two-person operation, especially when pulling up the sampler to break the suction (the sampler full of wet sand is heavy on its own). Two people are needed to eject the samples properly.
- For the hard work a "Hi-Lift" jack that 4WD enthusiasts use is a very good accessory to aid removal of the sample tube from the ground. We do manufacture tripods with hand winches for pulling casing in deep holes, which could be used to pull the sampler out in very sticky conditions, or when many samples are required but this adds to the cost and they are bulky to transport.
- Replacement O-rings can be purchased at most hydraulic retailers.
- The smaller the diameter of the sampler the easier it is to use.

A PROFILE SAMPLER FOR SATURATED SANDS

THE PROBLEM

- Collecting soil profiles from water saturated sites is difficult due to vehicle inaccessibility - sampling equipment has to be hand operated and easy to carry.
- When disturbed, saturated sands become a slurry and slump from conventional hand augers, sampling holes collapse so profile integrity is lost.



Sampler at the start of collecting a profile core.



Sampler almost completely in the ground. The platform has been moved up the tube.

THE SAMPLER

To sample saturated sands from a site at Kingscliff, NSW, a "wet sand sampler" was designed. The sampler consists of a stainless steel tube, a sealed piston, and a movable, weight-bearing platform. The sampler is driven into the sand by withdrawing the piston and standing on the platform. As the sampler is drawn into the ground, the platform can be moved up the tube. When the sampler is at the final sampling depth, the piston is secured and the sampler (and core) lifted from the ground. Samples are removed from the tube by fitting a sleeve to the sampler and releasing the piston - the sampler is shaken so core sections slide down to fill the sleeve.

At the Kingscliff site, a two metre, ten centimetre diameter tube was used. The sampler provided discrete samples from known depths, was lightweight and operated and carried (with samples) by two people.





This is a 50mm x 1.0Mt long Down Hole piston sampler used with the optional D-handle (just visible above the T-handle) connected to the piston rod for shallow sampling from the surface. The samples spaced out on the ground were plastic enough to be expelled without a catcher sleeve and the sample partly expelled inside the soft clear plastic tubing is much more fluid.

This is the same Down-Hole piston sampler configured a different way, to sample down a hole (below the surface). It has a rope attached to the piston rod and the rope passes through the pulley (supplied) that is held by the thread on the T-handle. When the rope is pulled downwards the piston is lifted upwards simultaneously as the sampler tube is pushed in.

If a second person is available, they can pull downwards on the T-handle or extension rod to increase the penetration rate.

The picture shows the layout, the sampler is normally in the ground.

