

ARCHWAY HYDRAULIC PISTON SAMPLER - OPERATING INSTRUCTIONS

INTRODUCTION

The hydraulic piston sampler is designed for taking undisturbed soil samples in very soft to stiff clays. The unit is rigid and of fixed length, approximately 2.85 metres long, and is designed for use whilst held in a vertical, stationary position.

The unit is supplied with a standard "B" rod male connection its top end, but adaptors can be supplied to suit any drill rod connection.

Thin wall sample tubes are available for attachment to the lower end of the hydraulic cylinder by means of 3 grub screws.

The only moving part is the hydraulic cylinder and attached sample tube. The standard sampler has a stroke length of 1 metre.

The necessary hydraulic load required for operation of the unit is usually generated from the hydraulic power unit on a drilling rig, but a separate hydraulic power pack can be supplied if required.

An oil flow rate of 20-25 litres per minute at 1500 p.s.i. is required for operation of the unit. The hydraulic power pack must have the facility for bidirectional flow of oil, as it is necessary to reverse the direction of oil flow during the normal operating procedure.

BASIC PROCEDURE

1. Prior to operation the compressible rubber seal on the piston head must be first adjusted to give a good seal in the sample tubes. The fit of the seal can be adjusted by loosening or tightening the three cap screws on the back plate of the piston head.
2. Attach the unit at the top end to the drilling machine, using an appropriate adaptor if necessary and connect hoses between the sampler and the hydraulic power unit. The intended depth of sampling will determine the length of the hydraulic hoses required. The attachment point of each hose to the piston is via 1/4" BSP threaded connections at the top end of the sampler.
3. Switch on the hydraulic power pack and experiment with the hydraulic controls to determine how the direction of oil flow influences movement of the hydraulic cylinder on the piston sampler.
4. Move the hydraulic cylinder to its lowest position so that the bottom of the cylinder is resting against the piston head.
5. Attach a clean sample tube to lower end of the cylinder by means of the 3 grub screws. In order to attain the best sealing conditions, grease should be applied to the upper end of the sample tube so that the rubber seal on the piston head is fully covered with grease when the sample has been taken.

6. Now raise the hydraulic cylinder to its uppermost position so that the piston head comes to rest at the lower end of the empty sample tube, just above the chamfered edge.
7. Lower the entire unit until the open end of the sample tube is resting on the ground to be sampled. This is the STARTING POSITION shown as A) in the Figure.
8. Keeping the apparatus stationary, now reverse the flow of hydraulic oil so that the hydraulic cylinder descends, forcing the sample tube into the ground. Allow the hydraulic cylinder to descend to the maximum extent. This is the position shown as B) in the Figure.
9. Better adhesion between the sample and sample tube is obtained by allowing the sample to rest in the sub-soil for about 5 minutes before withdrawing.
10. The entire unit is now raised from the ground by pulling back on the drill string at the connection point of piston sampler. If the ground is tough the piston sampler may be rotated 1 revolution clockwise to separate the sample from the underlying soil. The sampler must be taken up steadily without jolting or knocks, especially with cohesion less soil. This is shown as C) in the Figure.
11. The sample tube with enclosed soil sample can now be removed from the piston sampler by unfastening the 3 grub screws at the attachment point. Draw the sample tube slowly and carefully over the piston head and remove.
12. Place end caps on the sample tube, and attach a new sample tube. The cycle now repeats itself from point 5 above.

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