FLUTe™ Flexible Liner Underground Technologies, Ltd. L.C.
For a medley of innovative designs
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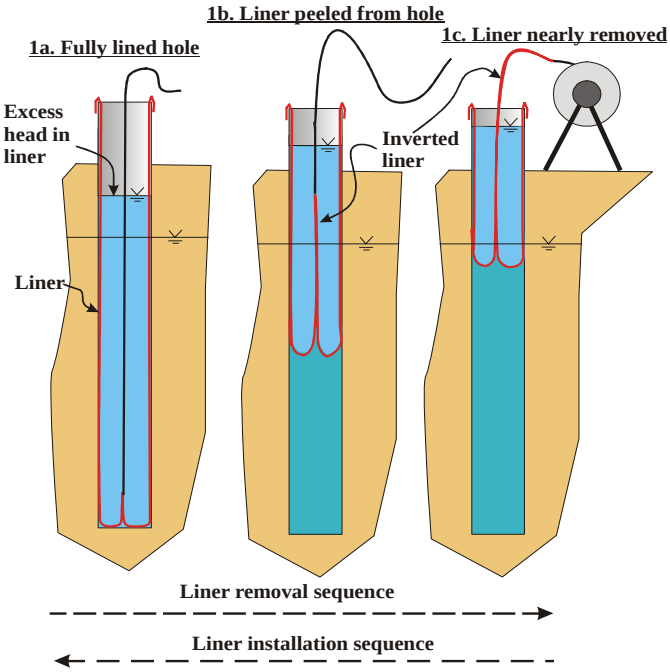
The FLUTe® Blank liner

Method: The FLUTe blank liner is a tubular urethane coated nylon borehole liner which is normally everted into place as shown in Fig. 1. It is easier to understand the everting process if one starts with the lined hole of Fig. 1a. The excess head inside the liner, above the water table in the formation, forces the liner out against the hole wall and forms a continuous seal of the hole much like a continuous packer. By pulling up on the tether shown in the figure, the liner inverts and can be peeled from the hole wall as the tether and then the liner are wound on a reel at the surface (Fig. 1b-1c).

Fig. 1. Blank liner removal and installation sequence



The installation procedure for the blank liner is the reverse procedure (Fig. 1c-1a). The inside-out liner is pulled from the reel and clamped to the top of the casing. The liner is pushed down into the casing to form an annular pocket. Water is added to the interior of the liner forcing the liner against the hole wall and down the hole, pulling the liner from the reel. As the liner "everts" down the hole (the reverse of peeling it out of the hole), the water in the borehole is forced into the formation. The liner will continue to descend in the borehole until it reaches the bottom of the hole or until all flow paths in the borehole are sealed by the liner and the water beneath the liner can not be forced into the formation.

Uses: The blank liner is a convenient method for sealing the borehole to prevent contaminant transport in the hole. Many geophysical measurements can be performed inside the liner, with the liner sealing the hole. Those measurements are: gamma and gamma-gamma logs, induction coupled electric log (resistivity), sonic logs of several kinds, temperature logs, radar measurements, and neutron moisture logs in the vadose zone. A very attractive use of the blank liner is the measurement (i.e., location and flow rate) of all significant flow paths in the borehole while the liner is descending into position. For details on this *Hydraulic Conductivity Profiling Technique*, visit www.flut.com, or call us at 888-333-2433.

The blank sealing liner is also used to prevent the leakage of grout from the borehole while sealing the annulus between a casing and the hole wall, or while simply grouting a borehole in a karst formation. FLUTe blank liners are manufactured to the borehole dimensions and come in a variety of tensile strengths and coatings for the particular application. After the blank liner seals the borehole and the flow paths measured, the *Water FLUTe®* allows multi level water sampling.