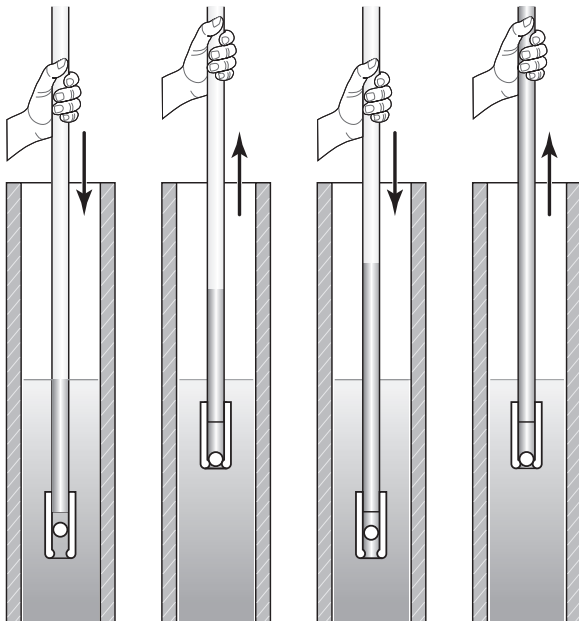


Operating Principles

The Waterra Pump is an inertial pump, simply consisting of a riser tube with a one-way valve at the foot. The valve allows water to enter the tubing as it is pushed downward, and retains the water when the tubing is pulled upward again. The inertia of the water itself provides the force to carry it up to the surface.

Pump Operation

1. Attach the footvalve to the tubing by hand-threading the self-tapping footvalve onto the tubing as far as it can go (at least 1/2" or 12 mm). This provides a secure, watertight grip.
2. Lower the tubing (footvalve end first) into the well to the desired pumping depth.
3. Repeatedly lower and raise the tubing and footvalve approximately 6" - 12" (15 - 30 cm). A slug of water enters the tubing on the downward stroke and is retained as the valve closes on the upward stroke. This enables the water to gradually rise in the tubing and discharge at surface.

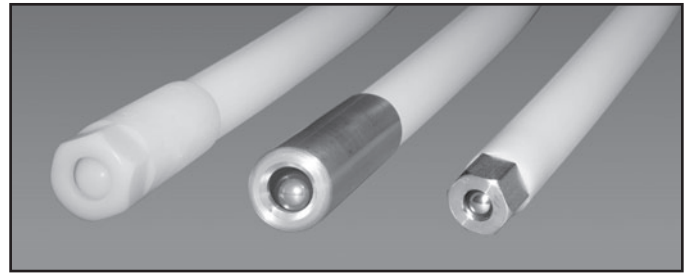


Waterra Pump Operation

Optimize the Pumping Rate

For the most efficient operation, the following points should be considered:

- The tubing should be as straight and rigid as possible and centered in the well.
- The pumping motion should be constant (i.e. no stops or delays) and the strokes should be distinct and rapid.
- The footvalve must be submerged at all times to operate.
- It is best to have the footvalve as deep as possible below static water level.



Well Development

Surge blocks are excellent for use as a well development tool, as they create a strong churning effect, which helps remove silt and fine sand during well development. They minimize the annular space between the footvalve and the well casing, pumping and surging simultaneously as the pump is operated. Turbidity is greatly reduced during well development. To operate, simply fit the appropriate size surge block over the body of the footvalve, and operate as described above.

Pumping silty water is possible, however, should the silt settle and clog the footvalve, it may be cleared by unscrewing the footvalve from the tubing and tapping the footvalve and tubing to dislodge the sediment.

In-line Disposable Filters

In-line Disposable Filters are easily connected to the riser tubing using the 1/2" (12 mm) tubing barb or 1/4" (6 mm) NPT inlet connector. The filters fit 3/8" x 1/4" (10 mm x 6 mm) or 5/8" x 1/2" (16 mm x 12 mm) tubing. Simply press fit the inlet into the tubing and operate the pump as usual. The outlet connector is a 1/2" (12 mm) straight tube. The operating pressure of the pump is sufficient to filter the sample.