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BESST Retro ZIST (Patented)

BESST Retro - Zone Isolation Sampling Technology: *the fastest way to reduce purge volumes!*

Purge volume reduction can be an important consideration for long-term groundwater monitoring programs. Early technical guidance from the US EPA Superfund Program prescribed the concept of 3-5 wet casing volume purging and was quickly adopted by many regulatory agencies throughout the US. This can lead to time, transport and storage problems when purging large volumes of water from a well, especially in remote or hard to reach locations. Isolating the well screen from the rest of the well casing sharply reduces the required volume to be removed.

Instead of using expensive and difficult inflatable packers to isolate the screened interval of a well, the BESST Retro ZIST uses a series of stacked conformable washers to seal the inside of the casing directly above the well screen with the perforated support post on the well bottom. *Standard Retro ZIST systems are designed for 2" and 4" diameter wells, with custom sizes available.*

Maximum Purge-Volume Reduction Using Volume Displacement Stems

Maximizing purge volume reduction is a key goal of the Retro ZIST technology. There are two aspects to this concept. First, the casing volume is addressed by using the stacked sealing washers to isolate the well screen from the casing above. Second, the well screen volume, which includes the surrounding filter pack, is minimized by the Volume Displacement Stem which supports the isolation washers and receiver. In addition, there are two deployment options available. Option #1 uses a screened PVC support post composed of stacked Displacement Barrels and Option #2 uses a sand-filled solid support inner

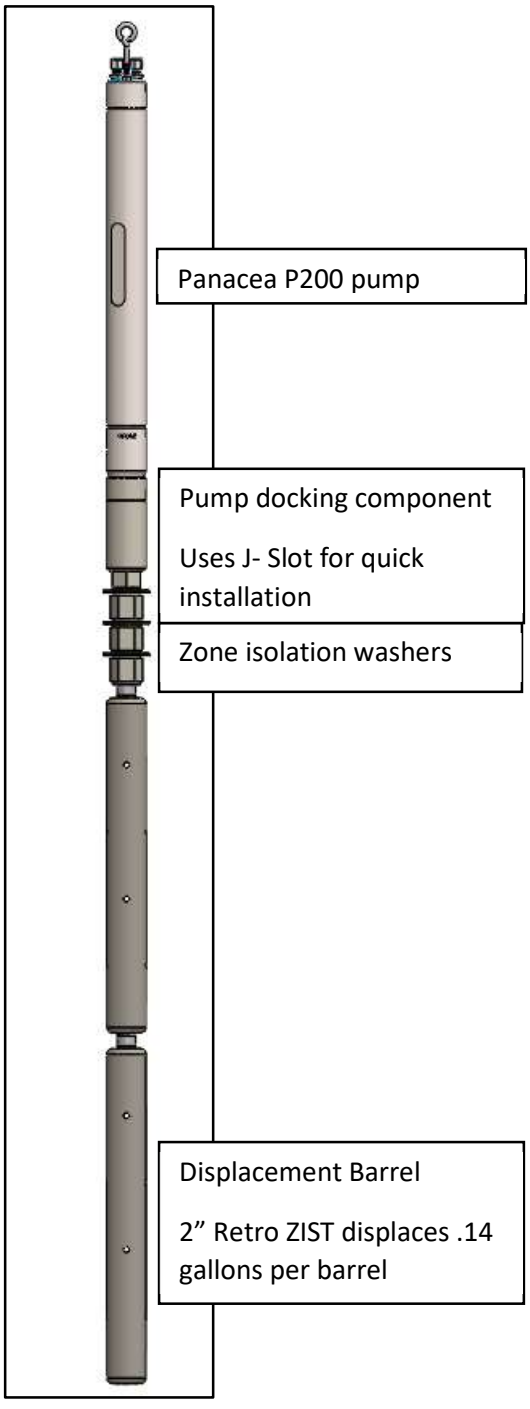

Figure 1 - Model of the Retro ZIST system for a 2" well using two displacement barrels stacked to fit length of well screen.

well screen. These options displace 65-85% of the water volume stored inside the well screen section of the well.

Water Level Measurements

Water level measurements are simply accommodated. The pump is lifted up a few inches off the docking station allowing groundwater within the well screen to communicate with the atmosphere and adjust to hydrostatic pressure over time. The tubing slack (from the slightly lifted pump) is attached via a tubing clip located on the underside of the well suspension cap. When the operator opens the well, the first task typically is to obtain a water level measurement. The pump is then reset into the conical docking station by lowering it a few inches until it seats – thereby allowing the well screen section to be purged and sampled.

Figure 2- Rhodamine dye showing the seal of a 2" Retro ZIST system in a clear PVC pipe. NOTE: The space beneath the flanges is not filled with water, but with air, representing a high pressure differential.

Case Study

For years, the Department of Defense facility in New Mexico had been grappling with excessive purge volumes generated in remote areas. Deployment of the Retro ZIST into 25 wells solved that problem.

Given the low permeability of these wells and the large purge volume requirement, BESST also provided the DOD with five Infinity Timer Control Units with cycle times up to 300 hours so that multiple well locations throughout the facility could be purged simultaneously over lengthy purge and recovery periods.