



Fluid Sampling

Groundwater is an essential resource for agricultural, municipal, industrial, stock and domestic use. Careful management of groundwater resources is essential to optimising the quality of social, environmental and economic life.

Qteq's Q-Tube Aquisample sampling system is a low-flow system that eliminates need for a submersible pump and can be set up to 2,000 m below ground. The system comprises a single BHA that is set at the sample intake depth. It is suspended on continuous twin-tube, or tube-in-tube, umbilical from surface.

This simple architecture greatly improves system reliability and reduces installation complexity, and thus time. All system downhole functionality is incorporated into a compact and rugged single-piece or modular BHA design. The modular design enables Q-Tube Aquisample systems to be combined with Insert Aquitraq pressure gauges.

The elegantly simply operating principle removes the need to impose an upper limit on sampling depth, with sampling time dictated by sample intake depth, relative to the standing fluid level. Furthermore, a novel deployment and suspension system has been developed that enables the Q-Tube Aquisample system to be set at the desired depth, using a truck, trailer or ute-mounted deployment technique.

Permanently installed systems also allow water samples to be subsequently captured without need for further borehole interventions.

The combination of a rapid deployment capability, simple downhole architecture and long-term reliability of Q-Tube Aquisample systems greatly reduces overall expenditure requirements.

The Q-Tube Aquisample HD system, for use in pressurised or deep boreholes, uses special strain relief adapters to ensure the HD Capillary Tubing are properly secured to the HD BHA. This tubing is reeled off a single spooling unit through an optional temporary PCE system, placed above a special design Wellhead Suspension & BOP Assembly. Once the HD BHA is at the desired setting depth, the HD Capillary Tubing is cut and anchored using a BOP split clamp arrangement inside the wellhead adapter. The umbilical is then routed through ports in a Bowen tree cap to maintain complete well pressure integrity.

The Q-Tube Aquisample Lite system, for use in shallow boreholes, is suspended from surface using a support wire, with Lite Capillary Tubing installed from a secondary spooler. In non-pressurised boreholes the Q-Tube Aquisample Lite system can be suspended from a Headworks Assembly or Wellhead Suspension Assembly.

Features and Benefits

- No moving parts, greatly improving system reliability.
- Single BHA architecture reduces installation complexity and time.
- Operating principle is not impacted by initial SWL or variation in SWL over time.
- All-steel BHA construction extends sample intake depth to 2000m below ground level.
- Solids tolerant, with debris removed using an over-pressure technique.
- Full sample pressure control maintained at all times.
- Can be combined with Aquitraq water level monitoring systems into a single suspended architecture.
- Compliant to API 6A, manufactured under API Q1 & ISO9001:2008.

Applications

- Low flow fluid sampling compliant with regulatory requirements.
- Low disturbance fluid retrieval.
- Through-tubing or steel/PVC boreholes with minimum 50 mm internal diameter.
- In-situ long life application.

Key Components

Q-Tube AquiSample HD

Q-Tube HD BHA

TSS 020011

A modular toolstring design, for setting depths down to 2,000 m. The toolstring incorporates a metal mesh filter, a proprietary capillary strain relief system, and features a wireline fishing neck. Amount and size of weight bars at bottom of the toolstring can be adjusted to suit the application and well depths.

Wellhead Suspension Assembly

TSS 020003

Incorporates a hanger clamp to suspend AquiSample systems in the borehole or well, and maintains full headspace pressure confinement following system installation. The assembly can optionally incorporate a Ratigan BOP to provide pressure control during deployment and retrieval of AquiSample systems. It is available in a range of pressure ratings, with flanged or threaded connections to suit every wellhead.

HD Capillary Tubing

TSS 020004

Employs a novel metal tube-in-tube configuration to deliver Nitrogen to the Q-Tube HD BHA, and return fluid samples back to surface. The Capillary Tube is deployed through a temporary pressure control system, allowing Q-Tube AquiSample HD systems to be installed under pressure.

Wellhead Sample Manifold

TSS 020005

Incorporates two easily accessible valves to control N₂/air supply and capture fluid samples, while maintaining wellhead pressure integrity.

Pump Controller

TSS 020006

Provides means to acquire water samples at depths up to 2000 m below ground level.

Q-Tube AquiSample Lite

Q-Tube Lite BHA – Option 1

TSS 020012

A compact single-piece toolstring design, for settings depths down to 1,200 m. The toolstring incorporates a metal mesh filter, integral weight bar and features a wireline fishing neck. The toolstring is suspended by a stainless steel support wire.

Q-Tube Combo BHA – Option 2

TSS 020015

This extended toolstring incorporates components of the Q-Tube HD & Lite BHAs, with an additional perforated housing added below the Fishneck. The cavity inside this perforated housing accommodates an Insert AquiTraq pressure gauge, with the Fishneck modified to grip the tubing encapsulated cable (TEC) used to power the gauge, and which replaces the need for a separate support wire.

Headworks Suspension Assembly – Option 1

TSS 020013

This assembly is suitable for boreholes with no headspace pressure. Headworks fittings to terminate and suspend Lite Capillary Tubing and stainless steel suspension wire into a surface flange providing user friendly access to blow down and sample discharge lines.

Wellhead Suspension Assembly – Option 2

TSS 020003

Incorporates a hanger clamp to suspend AquiSample systems in the borehole or well, and maintains full headspace pressure confinement following system installation. It is available in a range of pressure ratings, with flanged and threaded connection to suit every wellhead.

Lite Capillary Tubing

TSS 020010

Employs a novel plastic twin-tube configuration to deliver Nitrogen to the Q-Tube Lite BHA and return fluid samples back to surface.

Pump Controller

TSS 020006

Provides means to acquire water samples at depths up to 2000 m below ground level