

# ON THE LEVEL

Water Monitoring News and Updates

**Solinst**<sup>®</sup>

High Quality  
Groundwater  
and Surface Water  
Monitoring  
Instrumentation

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Spring 2017



## New! LTC Levellogger Edge: Level, Temperature, Conductivity

The LTC Levellogger<sup>®</sup> Edge is a compact instrument that provides reliable datalogging of water level, temperature, and conductivity. It offers a number of upgraded features including an 8 year battery life, memory for 27,000 sets of readings and a Titanium ceramic PVD corrosion-resistant coating. The LTC Levellogger Edge is excellent for saltwater intrusion investigations and for providing a general indication of overall water quality.

### Enhanced Features:

- High accuracy conductivity readings
- Autoranging 50 to 80,000  $\mu\text{S}$
- 6 pressure ranges (5 m - 200 m)
- Excellent corrosion resistance
- Multiple sampling options
- Long battery life
- 3 year warranty



## Extensive Groundwater Monitoring Program at Refinery in Australia

HydroTerra, exclusive distributor of Solinst products in Australia, was recently given the task of providing three CMT<sup>®</sup> Multilevel Systems to an alumina refinery in Queensland, Australia.

The groundwater monitoring program at the refinery includes monitoring one 7-channel and two 3-channel CMT Systems, and also biannually sampling 90 groundwater monitoring wells located in and around the refinery.

Many of the wells are sampled using Solinst Peristaltic Pumps and depths measured using Solinst Interface Meters. Some of the deeper wells are sampled using low flow micro-purge methods. Equipment used includes Solinst 101 Water Level Meters, Tag Lines, Bladder Pumps and the Electronic Pump Control Units.



Groundwater Sampling Setup Using Solinst Peristaltic Pump and Interface Meter

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## Groundwater Monitoring Program at Refinery in Australia

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CMT Multilevel System with Dedicated Sample Tubing



Sampling a Groundwater Well Surrounded by Flood Water

Biannual sampling of the CMT Multilevel Systems is done using small diameter footvalves and PTFE tubing. Separate tubing is left dedicated in each of the channels. The Solinst 102 Narrow Cable Water Level Meter is used to measure depth to water in each of the CMT channels.

Sampling rounds take place in many unique locations around the refinery, including coastal and inland. Field staff did encounter some difficult conditions, but were able to get the job done!

*Solinst thanks Stephanie Stone of HydroTerra, for providing the details of this project.*

## Selecting a Bladder Pump or Double Valve Pump

### When Would I Choose a Bladder Pump?



If the pump is to be placed within a couple of meters below static water level, it is recommended to use a Bladder Pump. This is because Bladder Pumps only rely on drive gas compressing the bladder to retrieve a sample. A Bladder Pump can be placed just inches below static water level and still retrieve a sample.

In contrast, a Double Valve Pump relies on the drive gas pushing down on a column of water in the drive line to circulate sample water through the pump and up the sample line. The higher the water column in the drive line, the better. A larger water column makes pumping more efficient, and you are less likely to drive/push air into the pump.

You may want to select a Bladder Pump if you or your field technicians are inexperienced with pneumatic pump operation. As discussed earlier, Bladder Pumps are easier to operate because of the presence of a bladder. It is also because of the bladder, that Bladder Pumps tend to be more easily accepted by Regulators.

Regulators, and you, demand high quality, representative samples for VOC analyses; therefore, there is a preference for Bladder Pumps because there is no risk of the sample being aerated. In addition, with the slow compression of the bladder, off-gassing is minimized and turbulence is reduced during sampling.

In general, if lower flow rates are preferred, only low volumes are required, and purging of the well is not needed, then a Bladder Pump is the way to go.

### Why Would I Choose a Double Valve Pump?

Because Double Valve Pumps have no bladder to limit the sample volume, they can provide higher flow rates and faster purging. This makes them ideal when purge volumes are required prior to sampling, but high quality samples are still required for VOC analysis. Double Valve Pumps can be used for low flow sampling, and can provide high quality VOC samples when operated properly.

With the absence of the bladder, Double Valve Pumps have better performance in silty or turbid environments. They are also easier to disassemble, and have fewer parts to decontaminate. This makes Double Valve Pumps great for sampling in particulate laden groundwater.

In general, Double Valve Pumps can provide higher volume samples, more quickly, and can be used at greater submerged depths than a Bladder Pump. When operated correctly, they can provide high quality samples that are very comparable to those obtained with a Bladder Pump.



For more information on the differences in pump design and operation, read the full article in our **ON THE LEVEL Blog**.

## Can Multilevel Groundwater Monitoring Really be Inexpensive and Simple?

The answer is yes – especially if you use a Solinst CMT Multilevel Groundwater Monitoring System. CMT Systems are low cost, quickly installed, and are easily customized to suit your multilevel groundwater monitoring needs.

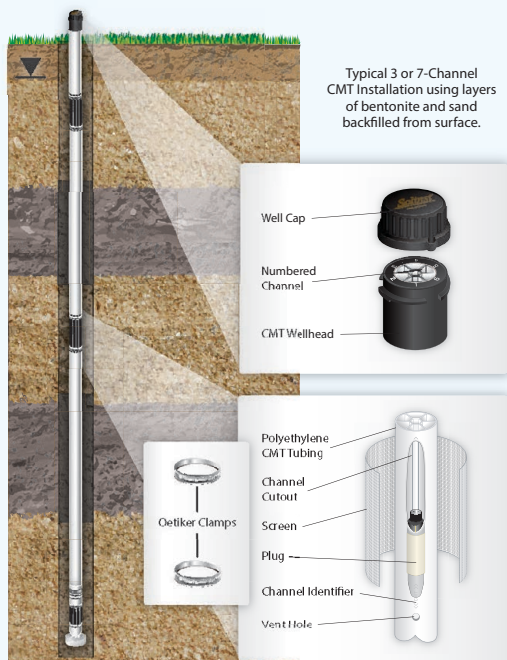
### What is CMT?

CMT stands for Continuous Multichannel Tubing. CMT is continuously extruded medium-density polyethylene (MDPE) tubing that has up to seven separate channels running through its entire length. CMT is supplied in continuous lengths up to 300 ft. (7-channel) or 500 ft. (3-channel), with no joints.

The 7-channel tubing is 1.7" in diameter, while the 3-channel tubing is only 1.1" in diameter. Each channel can fit 3/8" diameter monitoring equipment, allowing the insertion of narrow water level measurement devices or groundwater sampling pumps.

### So, how does this tubing become a complete multilevel groundwater monitoring system?

Monitoring ports are constructed manually using hand tools, and sealed off using engineered plugs and stainless steel screens. One monitoring port can be designated for each tubing channel. This means that you can design your CMT Groundwater Monitoring System to monitor up to seven discrete zones in one borehole, with each zone monitoring a different depth.



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## Absolute vs Vented Which Method is Right For Your Project?



Solinst offers both absolute (non-vented) and gauged (vented) water level sensors. Each type of water level datalogger is better suited to specific applications and conditions, and each has its advantages and disadvantages.

### Installation

Because they are all-in-one units, absolute Leveloggers tend to be easier to install. They can be simply suspended on a wireline or cord. Installation, therefore, tends to be less costly.

The gauged AquaVent must be deployed using a vented cable, which can be more cumbersome – especially when dealing with longer lengths.

### Maintenance

An advantage of absolute dataloggers is that they are low maintenance. Save for periodic visits for cleaning and maintenance, Leveloggers can be left for extended periods with little worry.

Traditional vented cable systems have desiccants that need to be replaced regularly to ensure the vent tube remains dry. However, Solinst designed the AquaVent so maintenance is at a minimum, with desiccants that provide permanent moisture protection.

### Accuracy

Generally, vented transducers can provide more accurate data in shallow applications, where the pressure sensor is placed close to the surface. However, the deeper you go, or with higher water level fluctuations, it is recommended to use an absolute sensor

Vented transducers may be subject to slow responses to small changes in barometric pressure, especially at greater depths.

Absolute pressure sensors have the advantage of recording barometric data. Barometric data can be used to determine barometric efficiency, which can be very significant, especially

in deeper confined aquifers. Vented pressure sensors assume 100% barometric efficiency and provide no barometric data to determine any difference.

The lack of barometric data also makes it difficult to determine if the vented transducer is recording correctly. A crimped, damp, or cut vent tube can cause erroneous barometric compensation and inaccurate data.

In shallow applications, the vent tube works well to transmit any changes in barometric pressure directly to the sensor. With absolute sensors you have to take into account any inaccuracies in both the level sensor and barometric sensor when looking at the final water level data, even in shallow installations.

### Applications

Vented water level dataloggers work well in very shallow applications with low expected water level fluctuations. They are also ideal when it is not convenient to install a barometric datalogger nearby.

Because vented water level dataloggers provide data that is automatically compensated, they can come in handy when real-time data is required, especially in short-term projects like pumping, and other aquifer characterization tests. Vented water level dataloggers can also save you time, reducing post collection data processing.

Absolute pressure sensors also have many advantages; due to their simpler designs, they are more convenient for transporting and installing in remote or hard to reach locations. They also tend to be lower in cost.

Absolute pressure sensors are suited for a broader range of applications, and have more tolerance and accuracy at greater depths. Absolute water level dataloggers are also a better choice in areas that are prone to flooding or exposed to long term freezing conditions.



## Can Multilevel Groundwater Monitoring Really be Simple?

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### Do you want to become a Trained CMT Contractor?

As the push to clean up contaminated sites continues, the need for high-resolution subsurface data is growing – so too is the opportunity for those offering environmental drilling services.

Solinst offers a training program for environmental drilling contractors to be recognized as “Trained CMT Contractors”.

The training program includes both instruction and hands-on demonstration for CMT construction and installation. Attendees learn proper handling, assembly, installation and monitoring techniques. In addition to drilling contractors, regulators and consultants often attend training sessions.

Solinst holds training sessions at our headquarters in Georgetown, Ontario Canada, as well as at conference and trade show events; Solinst staff also travel to drillers’ facilities to provide instruction. In some states, these training courses can qualify for continuing education credits.



Slide the Port Cutting Guide onto the tube with the numbers up-hole

Please contact Solinst should you wish to attend or set up a training session. You’ll see just how easy multilevel groundwater monitoring can be.

## 3 Simple Ways to Download Levelogger Data in the Field

Leveloggers are recording water levels in your monitoring well network, and it’s time to go out and collect your quarterly data – what options do you have for doing this?

Solinst offers three standard ways to retrieve Levelogger data in the field.

### Using Your Field Laptop and Solinst Levelogger Software



The first, and most standard method is to use a laptop with Levelogger Software installed.

To communicate using a laptop computer, you need a PC Interface Cable to connect to your Levelogger deployed on a Direct Read Cable, or you need an Optical Reader, if you have installed your Levelogger using stainless steel wireline or Kevlar cord.

The major advantage to using this method is having access to all of the features included with Levelogger Software. You have full programming capability, can view real-time readings, and can access the Diagnostic and Firmware Update Utilities.

### Using Your Smartphone and the Solinst Levelogger App



The Levelogger App Interface uses *Bluetooth®* wireless technology to connect your Levelogger to your smart device running the Solinst Levelogger App.

Once connected, you have access to all of the programming and downloading features also found in the Levelogger PC Software. If enabled on your smart device, your Levelogger GPS location is also logged when your Levelogger data files are downloaded.

The Solinst Levelogger App and Interface offers a convenient and efficient option for communicating with your Leveloggers in the field.

### Using the DataGrabber Data Transfer Device

The DataGrabber™ is the simplest method when all you want to do is download your data. It is also the most compact – it’s small

enough to fit in your pocket. (It’s also very affordable.)

The DataGrabber uses a USB memory stick to store your Levelogger data files. Like the Solinst Levelogger App, the DataGrabber connects to your Levelogger via a Direct Read Cable or an Adaptor.

The USB memory stick is inserted into the socket in the DataGrabber. With one push of the button, all of the data in the Levelogger’s memory is transferred to the USB stick – you can’t get much simpler than that.

Take that memory stick back to the office and download it to your PC for use in Levelogger Software.

