

WILD™—The Willowstick™ Instrument for Leak Detection

What is WILD?

Since 2004 Willowstick Technologies has developed and patented technology to track, model and predict groundwater flow paths and patterns. The technology has been used by geophysicists and engineers to deliver over 250 successful groundwater characterization projects. The same technology that tracks subsurface water is now being used in a new device to pinpoint water leaks or monitor infiltration through pipelines and tunnels. The Willowstick Instrument for Leak Detection (WILD™) is a tethered device that navigates water and wastewater pipelines detecting the location and volume of any leaks.

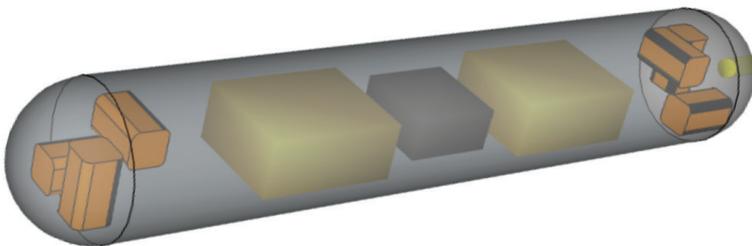
How Does It Work?

WILD uses well-known principles of physics and hydrogeology, such as: wherever an electrical circuit exists a magnetic field is also generated. Willowstick instruments measure the intensity of the magnetic field as the device moves through the pipeline. When water escapes from the pipeline, the intensity of the magnetic field inside the pipeline changes, and our instruments record the data reflecting that change. We use the readings combined with information we track about the relative position of WILD within the pipeline to determine the latitude, longitude, depth and circumferential location of the leak.

The diagrams on the front and back of this document illustrate views of the instrument and how it functions. WILD contains multiple magnetic coils, a battery, a navigation and positioning chip, lead and lag potential probes and data logging devices. The instrument is trailed by the internal electrode, circuit wire, fiber-optic communication wire, and tethering cables. The control center (CPU, memory, clock, navigation logic and other proprietary circuitry) is housed outside the pipeline in a companion unit, and sees the data in real-time to perfectly adjust the location of the instrument, and then post-process the data to create 3D models at the end of each day.

As WILD is moved through the pipeline, it records hundreds of thousands of data elements, detecting the precise location of leaks in the tunnel and enabling our algorithms to determine the volume of water that is leaking from the tunnel. The WILD instrument can be propelled back and forth through the pipeline by a Remote Operate Vehicle (ROV) or by a PIG attached to the instrument.

A second, or external, electrode, that completes the circuit, can be connected to the external utility grid or strategically positioned outside the pipeline if access to the grid is not available.



The highly sensitive coils that are the foundation technology for all Willowstick instruments are as adept at tracking changes in magnetic field intensity caused by water exiting or entering pipelines, as they are at tracking subsurface water flow paths. Even the smallest leaks result in changes to the magnetic field that are measured by WILD. The data collected by WILD is processed on site and then uploaded to the Willowstick cloud, where it is reduced to create 3D models of the water as it exits or infiltrates the pipeline.

As Willowstick biases our signature electric current to flow within a pipeline, the electric current follows the paths of least resistance, or the zones of highest conductivity, thus enabling our instruments to identify and measure the magnetic intensity of the flows as they leave, or enter, the pipeline.

What's Unique About WILD?

The WILD instrument takes a fundamentally different approach than acoustic, thermal imaging, visual inspection, sonar and other "brute force" approaches used to detect pipeline leakage.

- Willowstick models the expected magnetic field accompanying the electric current flow in the pipe, and then takes continuous readings using WILD to determine the actual flow. By comparing the ratio between expected and actual flow WILD can detect areas of significant variation, providing the ability to precisely pinpoint leaks
- Our software uses the data generated by WILD to model and estimate the volume of the identified leaks, and can compare multiple leaks to assess the relative severity
- WILD takes continuous readings many times per second to create a data dense solution with conclusions which replicate the actual situation in the pipeline
- WILD instruments generate and collect hundreds of thousands of data elements per kilometer, and use this "Big Data" to refine the acuity of our models. This enables WILD to identify the precise leak location and circumferential position
- Willowstick Compare™ works in conjunction with WILD so pipeline owners can observe changes in their asset over time or as a result of significant seismic events
- WILD is a new application of existing Willowstick technology, which has been proven by hundreds of customers over the last 12 years

