

Infiltration Study in Sewer Network

North Bavaria, Germany

Case Study



Expertise in Flow



2150EX Intrinsic Safe AV Flow System

Benefits and features of 2150EX Intrinsic Safe AV Flow System:

- Portable
- Low level velocity measurement
- Rugged, submersible enclosure (IP 68)
- Easily combined with other 2150EX flow meters or stand alone
- Data logging (79MB)
- Variable rate data storage
- Digital electronics ensure long term stable readings
- No level span calibration required
- Long battery life (8 months at 15 minute storage interval)
- ATEX –approved options available for Zone 0 & Zone 1 classified areas
- Modular design for easy field interchange and versatility
- Advanced velocity diagnostics for data verification

The ATEX Zone 0/1 approved 2150EX Area Velocity Flow Logger from Teledyne Isco is used for infiltration studies of sewer networks in the North Bavaria region of Germany. Groundwater infiltration is an indication of the sewer networks condition. The 2150EX Flow Logger accurately measures low level flows which can be caused by infiltration. The results are used to pinpoint areas of concern and to reduce network rehabilitation and WWTP treatment costs.



2150EX Flow Logger and Area Velocity sensor installation in pipe. The water seen in the picture is relatively clean, typical of infiltrated water.

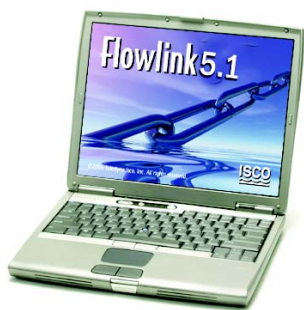
Infiltration in Sewer Networks

Infiltration is groundwater, or groundwater influenced by surface or sea water, that enters the sewer networks. The groundwater enters the networks through holes, breaks, joint failures, connection failures or other openings (roots). Therefore, infiltration is an indication of the sewer networks condition. The more infiltration registered the higher the need for a solution. No treatment is necessary for groundwater, due to its high quality; however, infiltration can potentially contribute to significant and unnecessary treatment costs. Extraneous water, from infiltration sources, reduces the sewer networks capacity and capability of transporting domestic and industrial wastewaters potentially overwhelming the network during storm events.

Site Challenges

Infiltration can best be measured during periods of dry weather and when domestic, industrial, and agricultural uses are at a minimum. Such periods typically have challenging low flow conditions, so the flow logger needs to operate with a Doppler enabled device for direct measurement of area and velocity. It needs to be battery operated for installation in remote applications and needs to have the highest IP rating possible (IP68) for installation directly in the harsh conditions of a sewer network. All sewer networks in Germany are classified as ATEX Zone 1 according to the EU Directive 94/9/EG – ATEX 95. This directive regulates the safety requirements for products used in potentially explosive atmospheres.

"The Future of Flow!"



Flowlink 5.1 Software

Benefits and features of Flowlink 5.1:

- Graphical and tabular reports
- Data editing
- Diagnostics
- Export/ import
- Automated tasks



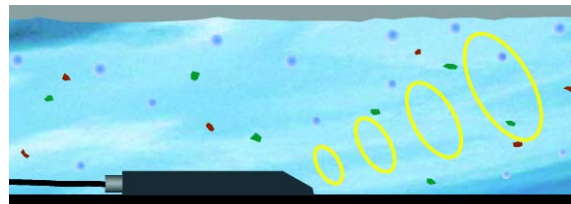
2194EX Network Interface Module

Benefits and features of 2194EX Network Interface Module:

- Permanent installations
- Provides power and data connection from safe area
- Modular design and can be connected to other 2100 series modules

2150EX Intrinsically Safe AV Flow System

The German engineering company, Härtfelder Ingenieurtechnologien GmbH, has actively used the Teledyne Isco 2150EX Flow Logger since 2008 for infiltration studies of sewer networks. The 2150EX Flow Logger is a fully ATEX approved Area Velocity Flow System using an optimized Doppler technology to accurately measure the true average velocity across the entire flow section in a wide range of applications and pipe sizes.



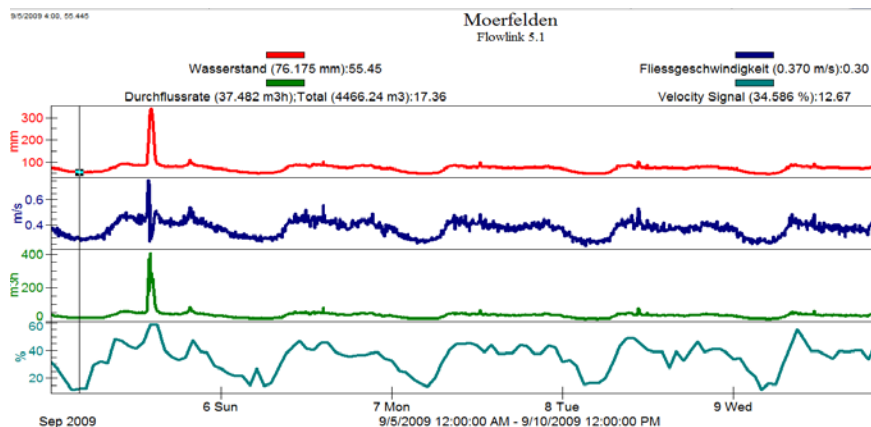
The low profile AV sensor can sense velocity in only a few (2.5) centimeters of liquid. For lower levels (<2.5cm), reliable velocity and flow rates are interpolated from a site specific curve based on the last 10 good velocity readings, making it ideal for low flow applications such as infiltration studies. Velocity quality and diagnostics parameters can be logged for every reading, providing excellent evaluation of site during installation or post analysis and verification of data.

The 2150EX probe is a smart sensor built on digital electronics, so depth signals from the internal pressure transducer are processed and digitalized in the sensor itself. A built-in temperature and pressure calibration data for the entire measurements span (0-3m) eliminates temperature drift, provides long term stability and eliminating span re-calibration.

Due to its robust and submersible enclosure (IP68), the 2150EX Flow Logger can be installed directly in the sewer network without fear of mechanical stress, pollution, or flooding. The system has a modular design, allowing easy replacement of batteries or the addition of a second logger unit in applications with two or more pipes or as a redundant system.

Customer Feedback

“We have been using the Teledyne Isco 2150EX Intrinsically Safe Area Velocity Flow System over several years for infiltration studies in sewer networks. We are very satisfied with the reliability of the system and the measurement results provided. Especially the sensor installation is fast and easy, saving time and effort. No site calibration is required other than adjusting level according to the sensor position. The system is simple to program and Flowlink Software is providing quick and easy graphs for review of measurement data.” – Dipl.ing. Härtfelder, Härtfelder Ingenieurtechnologien GmbH



2150EX data, including Velocity signal data, in Flowlink 5.1 software

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