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Badger Labs Monitors Industrial Wastewater Discharges Without Entering Manholes



Isco Flow Metering Inserts allow Badger Labs to monitor industrial wastewater discharges while eliminating the costs and hazards of entering manholes.

Badger Laboratories & Engineering Co., Inc., located in Neenah, Wisconsin, is a full-service environmental lab offering engineering and field services in addition to laboratory analysis. Services offered include industrial wastewater monitoring, sewer and storm water flow monitoring, hazardous waste sampling, groundwater monitoring, and air emissions monitoring.

According to Rick Larson, a Project Manager with 20 years of experience, Badger Labs has contracts with a number of municipalities in Wisconsin to monitor and analyze the wastewater discharge from industries located within those cities. Badger also contracts with individual industrial facilities to monitor their discharges.

Badger Labs conducts monitoring at a wide variety of industries, including pulp mills, meat packing plants, metal platers, food processors, soft drink bottlers, truck manufacturers, and electronics manufacturers. At each facility, a 1- to 3-day monitoring program is conducted on a monthly, quarterly, or semi-annual basis.

In addition to flow measurement, a 24-hour flow-proportional composite sample is collected each day. Samples from most industries are analyzed for BOD, suspended solids, pH, and phosphorus, while samples from facilities such as metal platers are also analyzed for cadmium, chromium, copper, lead, mercury, nickel, silver and zinc.

Isco Flow Metering Inserts

For the past 5 years, Isco Flow Metering Inserts have been a vital part of the monitoring programs conducted by Badger Labs. Isco Flow Metering Inserts provide a quick and accurate means of measuring and recording flow in round sewer pipes. Their patented* design allows the metering inserts to be installed from ground level, eliminating the costs and hazards of entering manholes.

The metering inserts are designed to be used with Isco bubbler flow meters, and are ideal for short-term (a few hours) or long-term (several weeks) flow measurement studies. Larson uses the inserts with Isco 3230 and 4230 Bubbler Flow Meters, and with a 730 Bubbler Flow Module plugged into an Isco 6700 Sampler.

Versatile and Accurate

Isco Flow Metering Inserts allow flow rates to be accurately measured in 6-, 8-, 10-, and 12-inch (150, 200, 250 and 300 mm) diameter pipes in manholes up to 16 feet (4.9 m) deep. Tested and calibrated** by St. Anthony Falls Hydraulics Laboratory at the University of Minnesota, the metering inserts provide accurate measurement from 1 to 640 GPM (0.063 to 40 l/s).

Durable Construction

Isco Flow Metering Inserts are constructed of durable, corrosion-resistant aluminum and plastic. A complete system consists of a metering insert and interlocking pole sections. Each metering insert includes an integral round orifice for measuring higher flow rates. An attachable 60° V-notch weir plate provides higher accuracy at lower flow rates.

Simple Setup and Operation

The metering insert is first connected to the flow meter, the bubble rate is adjusted to about one bubble per second, and the level reading on the flow meter is set to zero. The interlocking pole sections and the metering insert are then snapped together without tools. Using the pole from ground level, the metering insert is lowered into the manhole and positioned in the upstream pipe

The rubber bladder on the metering insert is then inflated using the hand air pump to seal and secure the insert in place. The flow meter is then suspended in the manhole, and the manhole cover is replaced. The flow meter then measures and records flow in the sewer.

When the monitoring project is completed, removing the insert is just as easy. The bladder is first deflated, and the pole is used to lift the metering insert to ground level. The metering insert can then be quickly disassembled for storage or transportation between monitoring sites

Advantages of Flow Metering Inserts

In conclusion, Larson said that Isco Flow Metering Inserts "have been a real help to us," offering three distinct advantages.

Safety - The hazards of entering manholes are eliminated.

Economics - "With the metering inserts, one person can set up a monitoring system from ground level in 30 to 45 minutes. That compares with two people taking from 90 minutes to 2 hours to enter the manhole and install a flume. And, no equipment is needed for confined space entry," said Larson.

Less people, time, and equipment make Badger Labs much more competitive, with the cost savings passed along to municipalities.

Accuracy - Larson says that the accuracy of the metering inserts "has been very good." He compared the metering inserts to an ultrasonic flow meter with a weir in one application, and to an incoming water meter at another site, and found the inserts to be within the published specification of $\pm 5\%$ in both instances.

**US Patent No. 4,571,997*

***Actual calibration test results available upon request.*

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