

Syscor Polymer Absorption Sensor *In-Situ* Testing Procedure

Syscor Controls & Automation’s underground well monitoring system uses a combination of sensors and absorption materials to reliably detect liquid hydrocarbon migration underground, even in the most adverse environmental conditions. The system is engineered for underground or waterlogged applications in or around potential hydrocarbon sources (Figure 1).

The underground well monitoring system is comprised of multiple sensor transducers. Each transducer is equipped with a polyvinyl tube for periodic *in-situ* sensor testing. The test procedure detailed in this document should be completed at least once per year. Testing should be performed on all sensors in a well.

These instructions must be followed carefully to ensure proper operation. Testing should be conducted with commonly available pressurized butane. Typical sensor response to butane is less than 10 seconds.

Materials Required for Testing

1. Small cylinder of butane suitable for refilling butane lighters and torches
2. Electrical tape
3. Compressed air (optional)

Notes

- Make sure only qualified personnel perform the testing.
- Testing requires the release of butane gas and therefore ensure that appropriate safety procedures are used.
- Testing should be performed without removal of the installed ground well assembly.
- Avoid puncturing or damaging the polyfluoro sleeve while conducting sensor *in-situ* testing. Damage to the polyfluoro sleeve may result in sensor water saturation within the sleeve which could attenuate hydrocarbon propagation towards the sensor and possibly delay detection.

In-Situ Sensor Transducer Testing Procedure

1. Confirm that the sensors to be tested are operating in normal condition and are not in alarm condition.
2. Remove protective plastic cap and cut tie-wraps to loosen the sensor transducer cables and polyvinyl test tubes (Figure 2).
3. Clean any potential debris from the test tube’s brass fittings (Figure 3A).
4. Remove brass cover (Figure 3B).
5. Wrap the butane nozzle with electrical tape (Figure 3C & 3D) to provide a tight seal between the nozzle and the brass fitting.

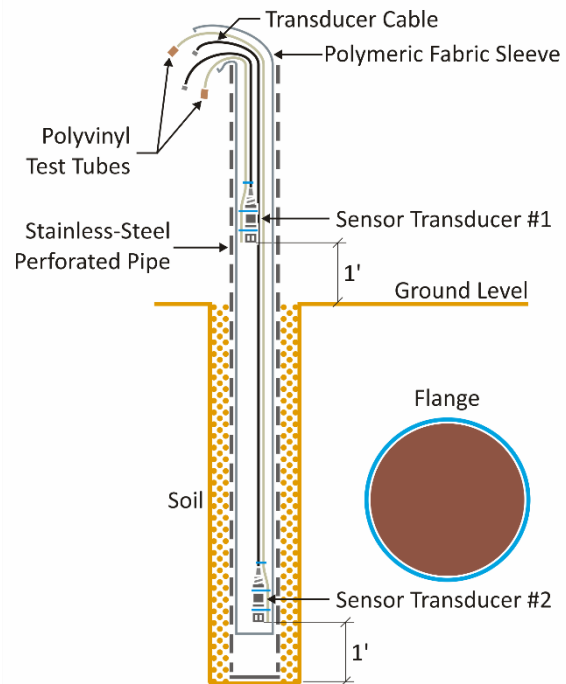


Figure 1: Underground Well Monitoring System

6. Spray butane into the test nozzle for approximately 2 seconds (Figure 3E). Check monitoring system if an alarm condition was detected.
7. If no alarm is detected, repeat step 6 and 7 up to a maximum of 3 times. If no alarm occurs, check the monitoring system logs and contact Syscor Controls & Automation for support.
8. If an alarm is detected, allow the system to recover from the alarm condition to normal condition. Sensor recovery from the alarm condition to normal condition after butane testing is typically less than 5 minutes.
9. If reset of the alarm condition does not occur within 30 minutes, use compressed air to purge the test tube. Perform a single 3 second burst of compressed air using a maximum air pressure of 60psi. Repeat if necessary.
10. Repeat steps 2 to 9 for the other sensors in the well.
11. After the well's sensors have been tested, retie the cables and tubes then secure the protective cap as described in the following procedure.

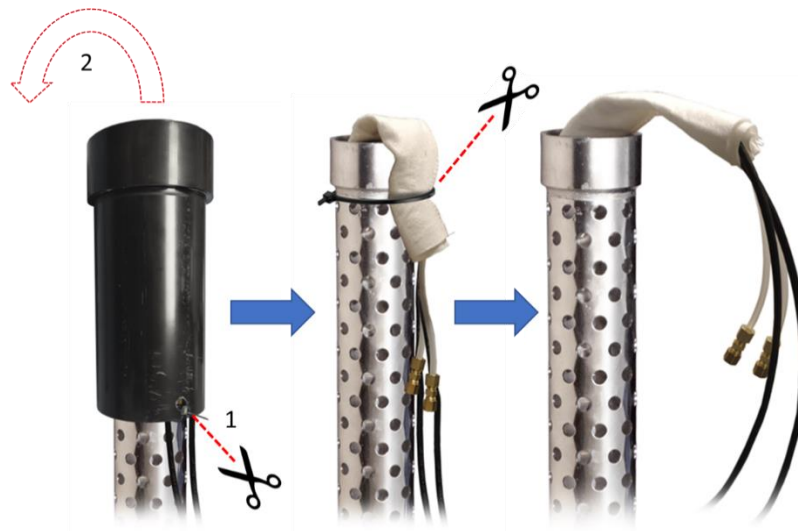


Figure 2: Removal of protective plastic cap to expose polyfluoro sleeve assembly

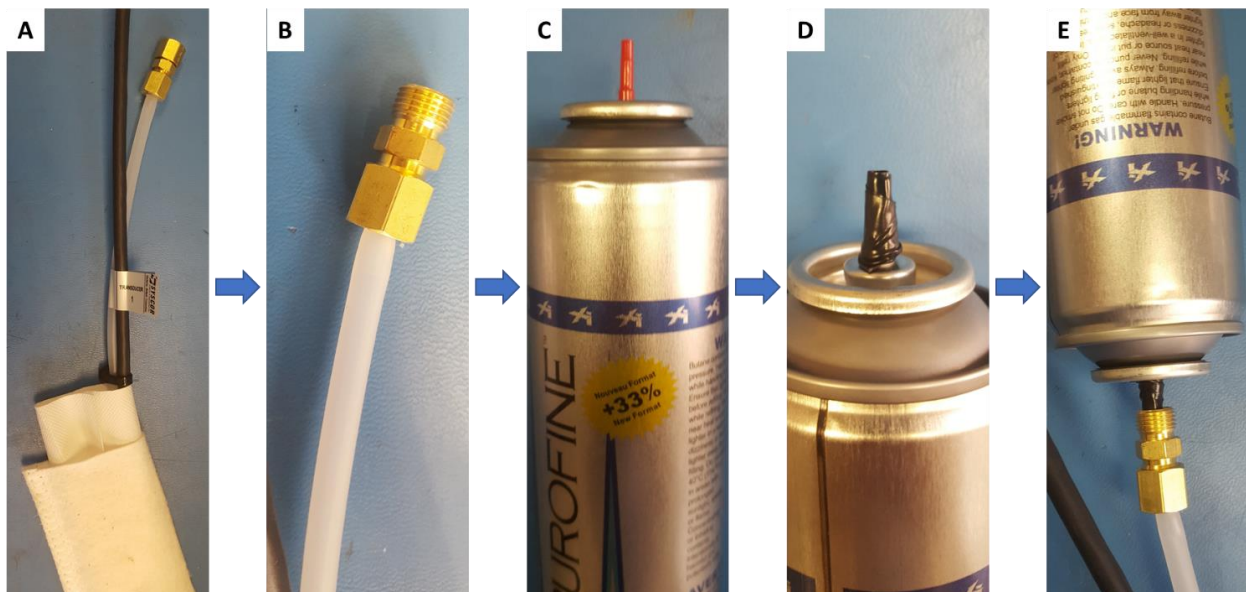


Figure 3: Step-by-step procedure for sensor transducer *in-situ* testing

Protective Cap Installation Procedure

The stainless-steel perforated pipe is fitted with a protective cap to avoid damage to the well monitoring system (Figure 4). The sleeve assembly is secured to the top of the pipe with a tie-wrap to prevent the assembly from slipping down the stainless-steel pipe.

1. Use a tie-wrap to bind the polyvinyl test tubes and sensor transducer cables together.
Make sure the test tubes are not compressed by the tie-wrap.
2. Fold the bound cables and tubes over the side of the stainless-steel pipe.
3. Use a tie-wrap to secure the sleeve assembly against the stainless-steel pipe.
Ensure that the test tubes are not compressed along the top edge of the stainless-steel pipe.
4. Place the protective cap over the top of the stainless-steel pipe and the sleeve assembly.
5. Use a tie-wrap to secure the protective cap through two holes on the perforated stainless-steel pipe.

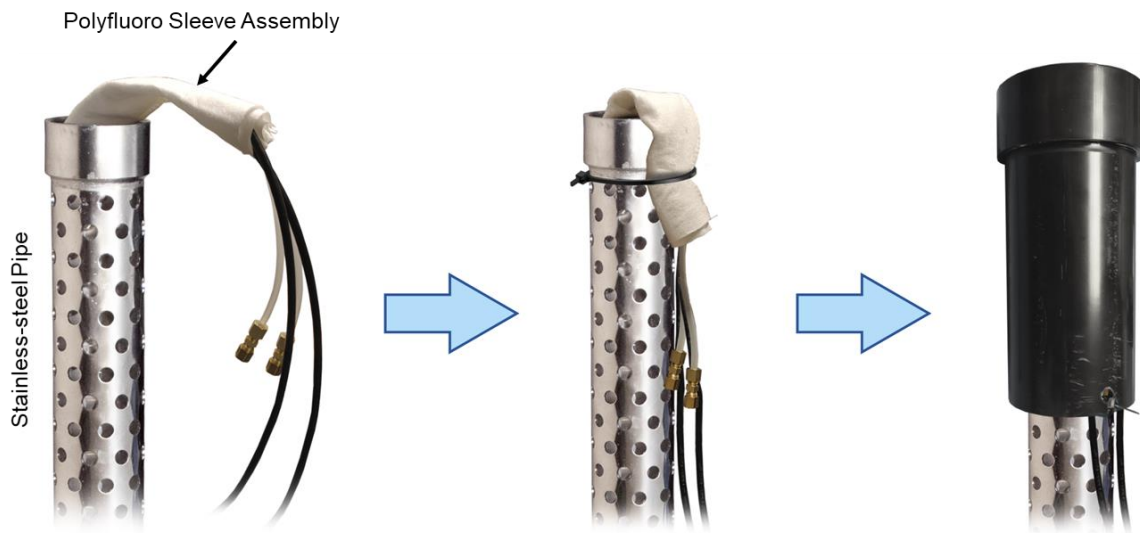


Figure 4: Assembly diagram for the protective cap installation

Syscor Controls & Automation Inc.

Suite 201 – 60 Bastion Square

Victoria, BC V8W 1J2 Canada

Phone: +1-250-361-1681

Toll-Free: +1-833-361-1681 (US & Canada Only)

Fax: +1-250-361-1682

Email: contact@syscor.com

Web site: syscor.com