

## Background

If you work in the chemical and petrochemical industry, you know the industry continues to face operational challenges on several fronts. Workforce reductions as your seasoned instrumentation engineers and technicians retire. Plus, the continuing drive to greater operational efficiency.

Dean Slejko, Swagelok's product manager, analytical instrumentation, explained, "The shrinking pool of analyzer technicians is causing great strain within the chemical and petrochemical industry. Adding to the strain even more is the rapid expansion of construction to meet the demands for natural gas liquids or NGLs. This latter commodity's value is typically more than twice the value of the gas alone."<sup>1</sup>

Slejko continued, "These constraints also mean the industry needs to review and revise past practices they have used to ensure that their sample handling systems were operating properly. For example, it's been a common practice in many facilities to send technicians out to check conditions at every analyzer house in a plant. But one report notes that 63 % of routine process maintenance checks result in no repair or service action because nothing's wrong!<sup>2</sup> In an era of workforces shrinking through attrition, is that the best way to deploy maintenance resources?"

"The industry is also investigating far broader use of automation. Although use of programmable logic controllers, PLCs, is widespread, the typical practice is to locate them remotely from the sample handling system and connect them via cabling which is routed through an intrinsically safe barrier. The industry needs a better automated solution; one that lets them capture critical data quickly, safely, and at the *right* time inside the sample handling system."

## A Smarter Solution

Swagelok, a trusted supplier to the industry for more than 65 years, knows the challenges you face and has developed solutions that focus on a critical part of your plant, its sampling handling systems.

The intrinsically safe Swagelok<sup>®</sup> Intelligent Control Module<sup>™</sup> (ICM<sup>™</sup>) product (patent pending) and intrinsically safe pressure and temperature PTX series transducers offer a unique set of capabilities that place intelligence directly into the sample handling system. Andy Creque, a senior electrical engineer with Swagelok, explains development of these products. He said, "Sample handling systems are the last stop before a sample is directed to an analyzer. Our thought was 'What if we could push intelligence down into the sample handling system itself?' By limiting energy levels, both thermally and electrically through smart design, we could achieve a Class 1, Division 1 / ATEX Zone 0 environment rating and place intelligent components directly inside a sample handling system.

"Then, the sample handling system could capture temperature, pressure, and flow of critical process and calibration fluids, manage sampling and purge cycles, and report all of this information in real time instantly, directly ahead of the analyzer."

The Swagelok design not only dispenses with the need for a traditional PLC and bulky, explosion-proof enclosures, the ICM product's ability to "talk" with plant control systems over industry-established networks and protocols makes it easy to integrate into an existing digital architecture. Requiring only an intrinsically safe power supply, the ICM product uses a CANopen<sup>®</sup> interface, an

intrinsically safe fieldbus, to communicate with analyzers or control systems via MODBUS TCP, a common and well-known industrial network protocol and architecture.

Slejko said, “During piloting of the ICM product with users, some described it as an intrinsically safe PLC, because it places the power of a PLC directly next to the analyzer. For existing facilities planning upgrades, the ICM product is easy to add into a plant’s control system. And for new construction it works with the highly-automated process control and data historian systems that new facilities will use.”

## Giving You Data You Couldn’t Collect Before

### ICM Product

The ICM product is the nerve center. Besides its ability to operate up to six pneumatic stream selection valves, two key advantages are its ability to communicate critical data continuously to your plant’s network and its embedded script processor (ESP). The first lets you compile data to develop trend analyses for the components in the sampling handling system and their performance. This capability is perfect for facilities migrating to predictive maintenance because it delivers performance data immediately and continuously.

The ESP lets you access an on-board library of scripts to capture temperature, pressure, or flow. Or, you can program the ICM product yourself to tailor its operations to your needs. The ESP uses Lua<sup>®</sup> open source software, a “C-like” scripting language, so you can develop your own scripts if desired. You can also direct the ESP to “loop” any of its routines for any interval your process requires and then transmit that information over your plant network. You can even monitor the script, reading information from the network and change its behavior while it’s running. That’s real power.

### Intrinsically Safe Pressure and Temperature PTX Series Transducer

The intrinsically safe PTX series pressure and temperature transducer offers multiple measurement capability in a single, compact package. Although there are other transducers of similar size, Swagelok’s intrinsically safe PTX series pressure and temperature transducer features a low-volume, zero dead-leg flow path. That means dramatically faster response, reducing delay time in your system. Next, it employs MEMS (micro-electro-chemical) technology for bonding the strain and temperature sensing function directly into the device’s metal diaphragm. Besides offering fast response, this sensor design needs no oil-filled cavities and requires no recalibration.

### Intelligence on the Inside

Creque cited an example, “Our ICM product and a pair of intrinsically safe PTX series pressure and temperature transducers with an orifice plate between them can be installed directly upstream of the analyzer inside the sample handling system to measure pressure and temperature, calculate flow, plus drive any operational or purge routines a user specifies.

“This is a real groundbreaker. Traditional transducers are never installed in an analyzer stream because of long purge times and the fact that they are not intrinsically safe. But, our intrinsically safe transducers solve that problem because their small internal volume purges quickly and cleanly. And, like the ICM product, they can be used directly in a Class 1, Div. 1 environment.”

## A Compelling Alternative

Swagelok's intrinsically safe ICM product and intrinsically safe PTX series pressure and temperature transducers offer users a serious, cost-effective, technically-compelling alternative to traditional design approaches for sample handling systems, including existing automated designs. With the Swagelok solution, users enjoy the confidence of:

- Real-time, intrinsically safe monitoring of sample handling system health, remotely or at the plant data network
- Greater uptime with less time spent troubleshooting
- Greater flexibility in deployment of maintenance forces
- Lower installed costs because of simplified wiring, reduced component footprint, and reduction or elimination of safety barriers

Slejko concluded, "It's the *combination* of features that customers are finding intriguing about the Swagelok solution because of how it can help assure delivery of a fresh representative sample to the analyzer. So often, the analyzer and sample handling system are viewed as separate entities when they are really reliant on each other. The Swagelok intrinsically safe ICM product and intrinsically safe pressure and temperature PTX series transducers place the sample handling system at a peer level with the analyzer."

<sup>1</sup> Nicole Friedman and Timothy Puko, *Shale Boom Shines Light on Natural Gas Liquids*, [The Wall Street Journal](#), October 29, 2014.

<sup>2</sup> *Reducing Lifecycle Costs with the Power of Fieldbus*, Technical References, Whitepapers, Fieldbus Foundation, <http://www.fieldbus.org/>.

Intelligent Control Module, Swagelok – TM Swagelok Company

CANopen – TM CAN in Automation e.V.

Lua – TM Faculdades Catolicas ASSOCIATION BRAZIL

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