

# Solvent Vapor Monitoring in Coil Coating Oven Atmospheres

## Application Note

COIL COATING LINE MANAGERS report that they experience three basic problems in solvent vapor monitoring. First and foremost, maintenance is burdensome. Sample lines clog, pumps break down, and analyser elements become fouled – all resulting in excessive labor and costly downtime.

Second, sensor accuracy is a problem. Because most analysers become contaminated, they must be checked and adjusted whenever there is a change in the solvents or coatings being run.

Third, under these circumstances, it is difficult to keep oven operation in compliance with applicable fire and safety codes.

As this report highlights, Control Instruments PrevEx Flammability Analyser, Model SNR675, solves all of these problems.

## Background

Coil coating ovens typically operate at high temperatures, with some zones at over 800°F. This temperature range is needed to cure organic polymer coatings to their substrate materials.

Solvents are typically vaporized in the early oven zones. At the same time, however, other materials are also vaporized: resins, plasticizers, additives and other compounds. Most monitoring problems arise because these materials condense when the sample temperature drops. In ordinary solvent vapor monitoring systems, external lines carry the sample 20 to 30 feet to the analyser. The oven atmosphere materials condense in the sample lines and the analyser because the temperature is too low to maintain a vapor state. In very little time, the sample lines, analyser and sample pump can become fouled and clogged.

Besides the frequent downtime needed to dismantle and clean the system, most analysers are inaccurate when monitoring varying types of solvents or coatings. The operator is faced with two unpleasant choices: either take the time to make meter calibration adjustments whenever solvents are changed, or calibrate once to worst-case model and operate inefficiently. (A system calibrated to worst-case will shut down the process too soon when monitoring other solvents).

In addition, fire codes and safety laws specify that coil coating processes must use continuous solvent vapor analysers when ovens are designed to operate above 25% of the Lower Flammable Limit (LFL). The analyser used must meet certain basic requirements as well as several provisions specific to coil coating. Where sensor accuracy is in questions, compliance may likewise be an issue.

***Because of its unique construction and operating technology, Control Instruments PrevEx Flammability Analyser, Model SNR675, is the optimum solvent vapor analyser for coil coating atmospheres, for five key reasons:***

### **Excellent in High Temperature Processes**

The Model SNR675's operating temperature is high enough to keep all oven atmosphere elements in the vapor state. The analyser further avoids condensation and maintenance problems through its simple flow system, which has no capillaries that can clog or pumps that can fail. The Model SNR675's mounts directly on the oven wall or exhaust duct without external sample lines.

In addition, the PrevEx materials of construction allow sampling in oven atmospheres above 800°F. These very high oven and sample temperatures in no way impede the analysers operation.

#### **Ten Times Faster than Remote Analysers**

The Model SNR675's simplified sampling and mounting design also dramatically improve response time- a fast 1 second response. This is ten times faster overall than systems with external sample lines and remote analysers (which require 10 seconds or longer to respond).

#### **Universal Calibration**

Unlike infrared and flame ionization designs that require response recalibration or correction when solvents are changed, the Model SNR675 gives close-to-linear response for a wide range of solvents. This feature is particularly efficient in coil coating where solvent mixtures can change as different products are manufactured.

#### **Fail Safe Operation**

The Model SNR675's proprietary flame temperature sensor technology is 100% reliable. Should a problem of any kind arise-loss of fuel, air, sample flow or power – the temperature of the sensing flame will reflect the change, alerting you immediately. By contrast, indirect sensing systems can fail yet still register normal operation.

#### **Low Maintenance, Easy Servicing**

Because sample condensation is avoided, service is by and large reduced to routine maintenance such as filter changes. The Model SN675's unique "block" design makes access easy and safe, even when the analyser is hot.