



## Solvent Vapor Monitoring in Coil Coating Oven Atmospheres

Coil coating line managers report that they experience three basic problems in solvent vapor monitoring:

1. Maintenance is burdensome. Sample lines clog, pumps break down, and analyzer elements become fouled - all resulting in excessive labor and costly downtime.
2. Sensor accuracy is a problem. Because most analyzers have a wide solvent response factor, they must be checked and adjusted whenever there is a change in the solvents or coatings being run.
3. Response time is hindered by external sample lines and remote analyzers.

As this report highlights, Control Instruments' PreVEx® Flammability Analyzers solve 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 analyzer<sup>1</sup>. The oven atmosphere materials condense in the sample lines and the analyzer because the temperature is too low to maintain a vapor state. In very little time, the sample lines, analyzer, and sample pump can become fouled and clogged. Besides the frequent downtime needed to dismantle and clean the system, most analyzers are inaccurate when monitoring varying types of solvents or coatings. The operator is faced with two unpleasant choices: either take the time to re-calibrate whenever solvents are changed, or calibrate to hardest to read solvent, which results in exaggerated readings and can cause unnecessary process shutdowns.

### Added Cost Savings Benefit

Fire codes and safety laws limit the maximum solvent concentration allowable to 25% of the LFL under worst case operation. Large volumes of ventilation air must be heated and circulated to keep the solvent vapors in the ovens at safe operating levels.

However, if a flammable vapor analyzer is installed as a safety control, the maximum allowable concentration is 50% of the LFL, which means not as much air has to be heated to dilute the vapors. This added benefit can result in dramatic fuel savings while maintaining safety and production levels.

### Optimum Analyzer for Coil Coating Atmospheres

Because of its unique construction and operating technology, Control Instruments' PreVEx® Flammability Analyzers are the optimum solvent vapor analyzers for coil coating atmospheres, for five key reasons:

#### Excellent in High Temperature Processes

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

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

#### Efficient Operation Reduces Maintenance

The PreVEx® Flammability Analyzer is a complete stand-alone LFL system, that's easily operated and maintained. It features predictive maintenance, a "service needed" message and relay contact, which anticipates the need for maintenance before faults occur. Its efficient operation, like the avoidance of sample condensation, reduces service to routine maintenance.

#### Fastest Response Time

By mounting the PreVEx® Flammability Analyzer directly on the process duct without heat trace sample lines, pumps, or blowers, you shorten the sample path significantly. This radically reduces sample delivery time to an industry best, 1-second response time.

<sup>1</sup> Because of the sensitivity of their electronics and other components, most other analyzers must be installed some distance from primer/topcoat ovens.



## Universal Calibration

Unlike infrared and flame ionization designs that require response recalibration or correction when solvents are changed, the PreVex® Flammability Analyzer 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 PreVex® Flammability Analyzer incorporates several fail-safe features designed to ensure perfect safety under all conditions. The inherent design of the sensing flame technology is that the flame must always be on and the system working properly or an alarm is given. Whether it is a loss of fuel, air, sample flow or power, a malfunction relay is automatically tripped and the operator is notified immediately of a status change. By contrast, indirect sensing systems can fail yet still register normal operation.

## Resources

For more information regarding NFPA 86 and solvent vapor monitoring, please refer to these additional technical and application notes:

- Understanding NFPA 86 (H7APP001)
- How to Select a Continuous Solvent Vapor Monitor to Meet NFPA 86 Requirements (H7APP008)

The National Fire Protection Association (NFPA) establishes fire safety standards, including standards for the safe operation of processes. NFPA 86, the Standard for Ovens and Furnaces, addresses the safe operation of Class A, B, C and D ovens, dryers and furnaces, thermal oxidizers, and any other heated enclosure used for processing of materials and related equipment.

Copies of NFPA 86 may be obtained from the National Fire Protection Association. Call toll free to order: 1.800.344.3555.