

Using Flammability Analyzers to Protect Thermal Oxidizers

Safety

The fuel value of VOC's present in the air stream, flowing through a modern thermal oxidizer, can greatly reduce the consumption of natural gas as the primary fuel source. Some oxidizers become self-sustaining, with VOC streams as lean as 5% LFL¹. While the added fuel value of many VOC's reduces the use of natural gas, it can also present a risk of fire or explosion if the concentration rises too high.

NFPA 86, the National Fire Protection Association's Standard for the Safe Operation of Ovens and Furnaces, defines direct-fired thermal oxidizers as Class A Furnaces mandating the use of continuous Flammability Analyzers on inlet streams that have the possibility of exceeding 25% LFL. The analyzer's job is to activate warning and danger alarms to initiate corrective action to prevent the stream from exceeding 50% LFL. The flammability analyzer can save the oxidizer from damage by overheating or destruction by fire or explosion.

The inlet streams of most oxidizers contain a mixture of VOC's in unpredictable proportions and concentrations. Oxidizers used for waste gas destruction often process streams of unknown content. In either instance, using an analyzer capable of measuring the true flammability of mixed vapors is imperative.

The Control Instruments Corporation PrevEx® Flammability Analyzers have the unique ability to accurately measure the total flammability of all constituents of the sample stream. Based on a proprietary flame temperature measurement technique, this analyzer requires no recalibration, adjustment or the use of response factors for most common process VOC's. This helps prevent false alarms and shutdowns by maintaining accuracy when process conditions change.

Cost Savings

The capacity of an oxidizer is limited. If an increase in VOC use due to a plant expansion or production increase would exceed the capacity of the existing oxidizer, flammability analyzers can be used to decrease air volumes from existing processes. This makes more efficient use of the existing oxidizer and is equivalent to expanding its capacity. Many printing, coating, laminating and other solvent-based processes use large volumes of heated air to dilute solvent vapors to safe

levels. Recirculating a portion of the hot exhaust stream in each dryer zone reduces the airflow through the oxidizer and lowers the air heating cost considerably². Such a solution is possible when the dryers are equipped with flammability analyzers.

Summary

When selecting a flammability analyzer, do not assume that one size fits all. The appropriate analyzer for a previous application is not necessarily the right choice for another. It's beneficial to select an analyzer that can cope with future changes in the sample stream composition. However, the specific details of each application need to be examined closely in order to prevent accidents. This is why filling out an application survey, given by a manufacturer's representative or engineer, is crucial to the selection process.

The instrument of choice may vary from one application to the next, but the correct process flammability analyzer will always be fast, accurate, and fail-safe. In most cases, it should be able to read a wide range of flammable substances.

¹Lower Flammable Limit.

²See Control Instruments Corporation Application Notes H7APP001 and H7APP008 for more information about NFPA 86 and how to select an analyzer which meets its requirements.