



PrevEx[®] Flammability Analyzers versus Catalytic Sensors for process applications

In most cases, catalytic combustible gas sensors have limited usefulness in industrial processes.

Selection criteria

Many fires and explosions occur in facilities which thought they had adequate protection against such hazards. Selecting a sensor which responds accurately to combustible vapors is important. So are speed of response and fail-safe performance.

Speed of response

By their very nature catalytic bead sensors are relatively slow devices. Sensor manufacturers try to balance the benefits of long operating life and reliability against speed of response by optimizing sensor mass, catalyst mixtures, predictive signal analysis, and other methods.

The response time of diffusion type catalytic sensors also depends upon the rate at which vapors can pass through its protective flame arrestor. Although some product specifications may give a response time based upon the diffusion rate of a light gas such as methane, process solvent vapors such as toluene or xylene diffuse much more slowly.

Failsafe performance

The only way to ensure that a sample reaches the sensor is to employ active sampling. Such drawn-sample systems typically use a vacuum pump to pull vapors from the process and across the face of the sensor. For vapors with dew points above ambient temperature, the entire sample train must be heated to prevent drop-out or clogging due to condensation.

Even a drawn-sample system can not assure that catalytic sensors will measure the vapors correctly, or at all. Flame arrestors clogged by sample particulate or moisture will block passage of the sample to the sensing element.

Sensing elements which become poisoned, coated or depleted will not respond to sample vapors. Nor will they provide any indication that they have failed. Elements which are still active but have lost some sensitivity over time will produce false safe readings.

Response factors

Catalytic sensors have a broad response range and will react to many different combustible vapors. But they react differently to different substances and do not have the ability to selectively measure just one substance in the presence of others.

When a sample contains vapors from more than one substance, safety codes require that the sensor be calibrated for the vapor to which it is least sensitive. This causes the sensor to overreact to the other components of the sample, generating false high alarms. Sensors safely calibrated for the vapors in a specific process often require recalibration when changing process set-ups.

Catalytic sensors are expendable devices. As they react with combustible vapors, some of the catalyst is depleted causing a shift in their response. When used to measure typical vapor concentrations in process applications, frequent recalibration will be required to assure proper performance.

Over time, catalytic sensors will lose sensitivity to some vapors while still being able to react to others. That is why a catalytic sensor can test good when calibration gas is injected even though it is unable to sense the presence of one or more of the process vapors.

Better technologies are available

Control Instruments is a major manufacturer of catalytic sensors. While they are well suited for many area monitoring applications, we rarely recommend them for process measurement. Instead, we offer PrevEx[®] Flammability Analyzers.

PrevEx[®] analyzers are fast-response, drawn-sample instruments. They have the unique ability to measure most common process solvent vapors, including mixtures, without the need for recalibration.

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Document H7APP024
Created 2/24/03
Revision A
Rev Date 6/07