

## White Paper

## Ethanol Leak Detection System

### Why Ethanol Leak Detection Matters

Ethanol plays an increasingly important role in modern fuel blends. Oil and gas companies now produce, transport, and store ethanol on a massive scale as they meet government blending mandates and consumer demand for lower-emission gasoline. Unlike traditional hydrocarbons, ethanol mixes easily with water. That simple fact creates a problem. Leaks often escape traditional detection systems because the alcohol dissolves into water rather than separating on the surface like gasoline or diesel.

This challenge presents ethanol handling as a distinct kind of risk. Contaminated groundwater can spread fuel compounds farther and faster when ethanol is present. Regulators take a closer look at these leaks because they can create long-lasting environmental and safety issues. Companies need a reliable way to identify problems before they turn into violations or costly cleanups.

### How Leaks Happen in Transfer and Storage

Ethanol moves from refineries to terminals and ultimately into pipelines and trucks. Each step creates opportunities for leaks. Unlike crude oil or refined fuels, ethanol does not stay separate from water. When a tank, pipe, or fitting leaks, the ethanol can dilute into surrounding water sources. Once this happens, most conventional sensors fail to detect the problem because they are designed to spot hydrocarbons floating on water, not alcohol dissolved within it.

### The Naftosense Solution

Naftosense developed a new detection system built specifically for this challenge. The technology ignores the presence of water and zeros in on ethanol and other alcohols. It works even at 20 percent concentration, which is the level regulators see as a real problem, while anything under 20 percent usually isn't treated as a threat.

This approach gives operators confidence that they can identify issues promptly and take action before minor problems escalate into significant events.

Naftosense's ethanol leak detection system consists of probes installed in sumps, containment areas and low points. Sensor probes (FLD-PSP) are factory installed in a SS slotted tube and connect to a



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field box (FLD-RTD). Alarm outputs to a Rosemount 248,648, or 848 using a RTD output. Easily integrate using the WirelessHART network into SCADA / PLC.

Leak sensor probes can be cleaned using tap water. System comes with a 10-year factory warranty on sensor and controls. Designed for hazardous area installation.

The FLD-PSP is a fully encapsulated high-performance sensing probe designed for detecting leaks of alcohols and ethanol. It is also sensitive to fossil and sustainable fuels, crude oil and polar/non-polar solvents.



### Typical Detection Time at Ambient Temperature

|                                 |                         |
|---------------------------------|-------------------------|
| 20%-100% vol. alcohol in water  | 2 - 2.5 minutes         |
| Gasoline and other hydrocarbons | 30 seconds - 10 minutes |
| Hydrocarbon vapors              | 3 - 4 minutes           |

The FLD-F4RTD-4-PS is an advanced acquisition module designed for reliable detection and location of unwanted presence of polar solvents such as alcohols, ethanol, acetone/MEK, etc. It can also be used to detect hydrocarbon liquids and their vapors. The module provides the leak alarm level allowing adjustable thresholding from the associated monitoring panel. The FLD-MXM-PS module has built-in specific algorithm for tracking the electrical conductivity between the detection cable sensor wires for very efficient reduction of the false positives due to condensation, conductive dust, dirt, etc. (intelligent thresholding).

FLD-F4RTD-4-PS is designed to be connected to one Rosemount wireless RTD temperature transmitter (248,648, & 848 models), connected to one polar solvents or hydrocarbon sensor. All devices are stand alone hazardous area rated so the complete system can be deployed in any environment.

Because the entire system is battery powered and uses the wireless heart communications you can integrate leak detection very efficiently eliminating the need of additional infrastructure.

The outputs to SCADA / CMS are scaled along the temperature range to give you the ability to see everything occurring

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### RTD Output indications

| OUT1 – Status and Relative Contamination |                           |
|------------------------------------------|---------------------------|
| Normal status:                           | 100 Ohms                  |
| Self-Calibration Mode                    | 90 Ohms Sensor            |
| Sensor String Break or Short             | 60 Ohms                   |
| Hardware failure/Low battery             | 75 Ohms                   |
| Leak alarm w/ level                      | 151 – 290 Ohms (32 steps) |
| Battery too low, device off              | > 1 kOhms                 |