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JF-1A In-line Conductivity Sensor

In-line Conductivity Analysis

ASTM D2624



- JF-1A sensor is specified in ASTM D2624
- Precise measurement of fuel conductivity and temperature
- Range: 0-2000 pS/m (0-35°C)
- Easy installation - certified for ATEX Zone 1 safety standards

Conductivity in Fuels

Conductivity is a significant parameter for safe and economic handling of fuels that can generate dangerous static charge so it is important to monitor it throughout the distribution line.

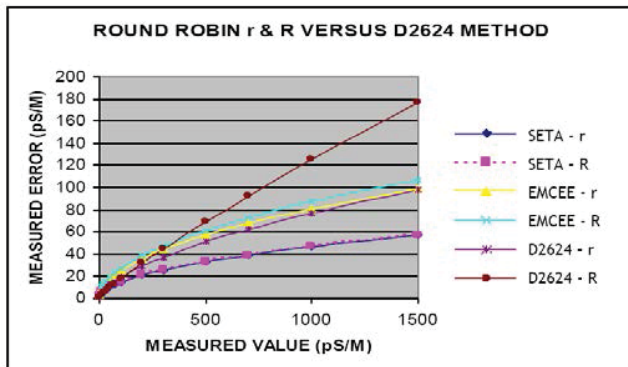
Aviation fuels are highly refined with a very low conductivity and therefore have the potential to accumulate a very high static electrical charge which can lead to sparking and ignition of explosive vapours. typically such fuels are pumped at velocity through distribution lines and filters causing the potential for an electrical discharge. The strength of the charge being dependent on the conductivity of the fuel and the pumping velocity. In addition to this, conductivity is strongly temperature dependant - the lower the temperature the higher the probability for retained charge in a fuel.

Industry Specifications

To help ensure safe fuel storage and distribution, Airlines and regulatory bodies established ASTM D2624 for Electrical Conductivity of Aviation and Distillate Fuels and ASTM D1655 for specifying permissible levels of fuel conductivity.

ASTM D2624 Precision

Repeatability (r) & Reproducibility (R)



Graph From: Published ASTM D2624 Round Robin

DC Voltage Conductivity Measurement

Traditionally fuel conductivity was measured using a Direct Current (DC) based electrical sensor which is dipped into a fuel sample.

What are the drawbacks of using DC electrical sensors?

- Measurement requires the fluid to be absolutely still
- DC based instruments need to have '3 Seconds & Read' operation
- DC voltage is highly dependent on temperature



In-line Conductivity Analysis

In-line conductivity analysis, rather than hand sampling, provides a continuous 24/7 highly accurate record of product conductivity levels inside the distribution lines. Therefore offering operators the ability to continuously measure conductivity levels, assuring regular compliance with conductivity level requirements.

Measurements taken using In-line analysis are taken at the actual temperature conditions inside the tank or pipeline removing inaccuracies due to thermal changes when manually spot testing,

Who should use In-line analysis systems?

- Refinery Run Down Lines
- Marine & Truck loading/offloading
- Pipeline Distribution Terminals
- Fixed Base Operators (Airports)



Alternating Current (AC) Measurement

AC sensor technology allows samples to be measured without the problems associated with fuel relaxation or errors created by current drain to the sampling container material.

What are the benefits?

- Fuel sample does not need to be static
- Unaffected by bias drift & therefore less opportunity for error
- 24/7 recording capability
- Real time measurement in the product line

In-line Conductivity Sensor (D2 JF-1A)

ASTM D2624

The JF-1A In-line Conductivity Sensor referenced in ASTM D2624, provides real time, high accuracy measurement of conductivity in chemical pipelines. Operators are instantly alerted to out-of-spec levels of conductivity that may lead to unsafe conditions or undeliverable fuels.

The sensor can be connected to the refinery/terminal management system to provide an automatic and continuous record of product conductivity levels thus eliminating the requirement for manual sampling and record keeping.

The JF-1A In-line conductivity sensor allows precise control and measurement of SDA Additive Injection. When installed with an automatic dosing system the sensor allows automated additive addition to maintain the conductivity within specified limits.



Key Features

- JF-1A sensor is specified in ASTM D2624
- Precise measurement of fuel conductivity and temperature
- Range: 0-2000 pS/m (0-35°C)
- In-line measurement using AC technology
- Easy installation - certified for ATEX Zone 1 safety standards
- Suitable for connection to additive dosing systems
- Connected to standard 4 to 20 mA current loop
- Stainless steel construction
- Easily fitted and retracted from the pipeline via a retractable mount
- Can be fitted to pipes of various diameters
- ATEX, FM, FMc, Certified for Zone 1, Hazardous Areas
- 16 Bar pressure or 100 Bar with the High Pressure Unit

In-Line Conductivity Benefits

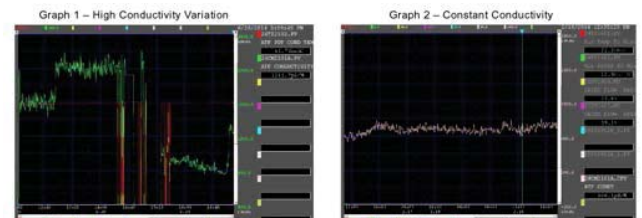
- Warning alerts can be configured if unacceptable conductivity parameters are detected
- Allows automated fuel additive control & therefore eliminates manual injection and batch sampling of additives
- 100 Bar high pressure model available for operation in high pressure pipelines



Principles of Operation

The JF-1A In-line Conductivity sensor is designed for operation on a variety of pipe diameters. The low-power sensor operates on industry standard 2-Wire Instrument Loop providing a 4-20 mA output scaled from 0 to 2000 pS/m (multiple ranges available). A second 4-20 mA output of temperature is standard. The system can also be operated in a 4-wire configuration for users requiring serial data output.

Graphs 1 and 2 show the effect of the In-line Sensors. Graph 1 shows the irregular dosing attributed to manual control of the system; graph 2 shows the fine control achieved by an automated injection system.



Technical Specifications:

Sensor Parameters:	Conductivity
Range:	0-1000 pS/m or 0-2000 pS/m
Temperature:	-20 to 60°C (-4 to 140°F)
Temperature Sensor:	Platinum RTD NIST Traceable Calibration
Accuracy:	+/-2 pS/m or +/- 2% of reading (+/- 0.5°C)
Pressure:	16 Bar max pressure (or 100 Bar for high pressure model)
Resolution:	0.1 pS/m
Sensor Type:	316 S.S. Coaxial Electrode
Calibration:	Internal Source Zero and Scale

Ordering Information:

JF-1A In-line Conductivity Meter	99500-0	16 Bar max pressure
JF-1A In-line Conductivity Meter HP	99505-0	100 Bar max pressure

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