

JF-1A-HH Handheld Conductivity Sensor

Conductivity Measurement of Aviation Fuels

ASTM D2624; IP 274; DEF STAN 91-91; ASTM D1655, ISO 6297



- JF-1A instrument is specified in ASTM D2624
- Precise measurement of fuel conductivity and temperature
- Range: 0-2000 pS/m (0-75°C)
- Portable operation - rechargeable lithium-ion battery

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.

Static Dissipative Additive (SDA), also known as conductivity improver, is often added to fuel to achieve specification levels. These additives raise a fuel's conductivity to safe levels where electric charge can more easily relax from the fuel by dissipating to the walls of the storage tank or pipeline thus greatly reducing its potential to spark.

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.



What effects could high conductivity levels have on fuel?

If a fuel has a high conductivity level this may indicate or presence of conductive contaminants such as; rust, soot, water, organic acids which raise concerns about fuel cleanliness and the effectiveness of fuel filters.

Who should test for Conductivity in jet fuel?

- Fuel terminals
- Refinery fuel quality control
- Laboratory personnel
- Oil companies
- Pipelines
- Aviation fuel QA personnel



Alternating Current (AC) 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

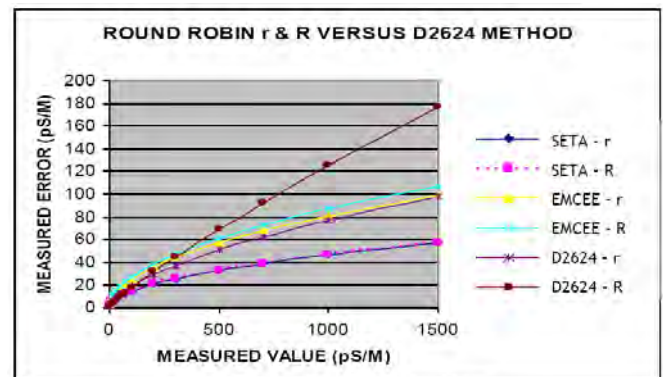
AC sensor technology allows samples to be measured without the problems associated with fuel relaxation or errors created by current drain to the sampling container material.

What are the benefits of AC?

- 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

ASTM D2624 Precision

Repeatability (r) & Reproducibility (R)



Graph From: Published ASTM D2624 Round Robin

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The Seta D2 Handheld Conductivity Meter (D2 JF-1A-HH model) meets the requirements of ASTM D2624. It provides an accurate and rapid conductivity measurement of distillate fuels and is specifically designed for testing low conductivity fluids such as; aviation kerosene, ULSD, home heating fuel, Naphtha and printing ink.

Key Features

- JF-1A instrument specified in ASTM D2624
- Precise measurement of fuel conductivity & temperature
- Range: 0-2000 pS/m (0-75°C)
- AC technology allows measurement of static & flowing fuel
- Portable operation - rechargeable lithium-ion battery
- Calibration kit available
- Integral memory - stores up to 8 Data locations
- USB interface for ease of data transfer to user
- Fully temperature compensated measurement
- Windows data handling software
- Built for Class 1 Div 2 Hazardous Locations

Principles of Operation

The JF-1A-HH Conductivity Meter is constructed of thermally stable internal electronics and two 316 SScoaxial electrode sensors.

The Conductivity Meter incorporates innovative electronics Digital Signal Processing (DPS) techniques to accurately determine the electrical conductivity of fuel products.

The instrument allows users to measure samples in any container, such as; a bucket or glass jar, offering an accurate, portable solution for measuring fuels in tanks, in the field or laboratory.

An easy to use menu system allows up to 8 samples to be internally stored along with sample temperature, date and time information.

This data can be held in internal non volatile memory for either readout on the display or transfer to a personal computer by a built in USB data link.



Calibration & Verification Tool (99714-0)

The calibration & Verification tool fits easily onto the tip of the Handheld Conductivity Meter for quick and easy calibration or verification of the instrument.

It has one switch to easily alter the range from low value (200 pS/m) to high 600 pS/m

This allows the user to verify or calibrate conductivity in the field thus eliminating the costly requirement of returning the instrument to the factory.

The kit, housed in a protective case, comprises of a calibration and verification tool, USB cable, software and instructions.

The calibration and verification device is supplied with a full certificate and need not be re-certified for 3 years.



Optional Accessories

Bench Stand

Designed to hold the Handheld Meter upright allowing the user to easily run tests. the stand is a sturdy rugged metal design which is easy to assemble and disassemble for transportation.



Metal Beaker with Ground Strap - 600mL

The stainless steel beaker is welded with a metal grounding strap to allow any DC charges to dissipate (without affecting measurement).



Technical Specifications:

Parameter	Conductivity	Temperature
Range:	0-2000 pS/m (contact factory for optional ranges)	0-75°C
Accuracy:	+/- 1.5 pS/m (+/- 1.5% of reading)	+/- 0.5°C
Resolution:	0.1 pS/m	0.1°C
Power:	Built-In 2.6Ahr Lithium Ion Battery (1000 samples) Universal Voltage Wall Mount Charger	
Outputs:	128X64 Dot Matrix Display Indicating Conductivity & Temperature Sample Trend Line Graph to Assist Data Collection	
Conductivity Sensor:	316 SS Coaxial Electrode K=.02	
Temperature Sensor:	Platinum RTD NIST Traceable Calibration	
Materials:	Instrument housing Polyamide, sensor 316SS and PEEK Instrument housing ATEX, FM, CSA, UL, CENELEC	

Ordering Information:

JF-1A-HH Handheld Conductivity Sensor for Fuels:	99708-0	0 to 2000 pS/m
JF-1A-HH Handheld Conductivity Sensor for Oils:	99707-0	0 to 2000 pS/cm
99708-0 Conductivity Calibration & Verification Tool:	99714-0	
99707-0 Conductivity Calibration & Verification Tool:	99715-0	
USB Cable:	99708-001	
Bench Stand:	99708-002	
Metal Beaker with Ground Strap (600ml)	99708-003	
Carry Case:	99708-005	