JetDC 88500-0

Measurement of Relative Permittivity (Dielectric Constant) and Density of Aviation Fuels

IP 638; ASTM D924; ASTM D4052; IP 365; ASTM D4054; ASTM D7826

- Small Scale automated temperature scanning method
- Relative Permittivity (Dielectric Constant κ) measurement range 1.000 to 2.500
- Density range 1 to 900 kg/m^3
- Controlled temperature from 0 °C to 40 °C
- Low temperature option with chiller
- Integrated apparatus
- Results in less than 10 minutes
- Full test (5 temperatures) in approx 30 minutes
- Large 9.7" touch screen
- Used to evaluate synthetic aviation fuels and additives

• Sustainable Aviation Fuel •

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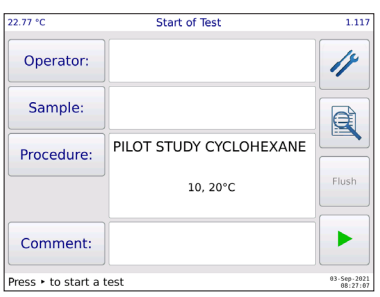
The Seta JetDC is an automated, benchtop instrument designed to determine the relative permittivity (dielectric constant), density and temperature relationship of aviation turbine fuel and fuel containing synthesised hydrocarbons and synthetic blending components which meet the requirements of ASTM D7566 and aviation gasoline. The relationship between these parameters is used to predict behaviour in aircraft gauging systems.

Sustainable Aviation Fuel (SAF) represents an important route to reduce global net CO_2 emissions. SAF is produced through many different processes, using different feedstocks such as used cooking oil, syngas, fats, vegetable oils, greases, sugars and alcohols. SAFs are approved for use through a standardised testing process.

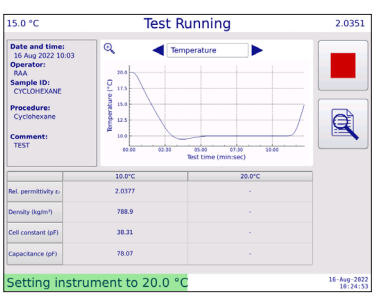
The molecular make up of conventional aviation turbine fuel and SAF are not identical and there can be a difference in the dielectric constant, density, temperature relationship. This relationship is used by many aircraft gauging systems as part of the mechanism to determine how much fuel is on board the aircraft. As such capacitive fuel gauge accuracy relies on the dielectric constant properties to be similar across jet fuel batches.

Suitable for testing in accordance with ASTM D4054, Table 2 and ASTM D7826, Table 2.

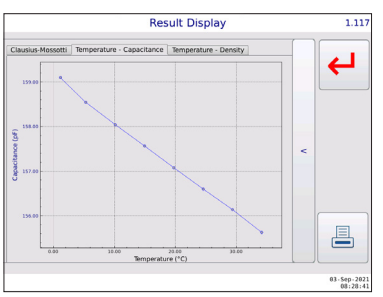
Operator Interface



> Enter operator and sample details, press ▶



> Test progress displays



> Final result displays. Data can be viewed as Clausius - Mossotti, Temperature - permittivity, Temperature - density

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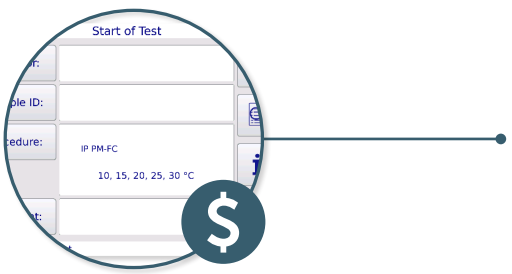
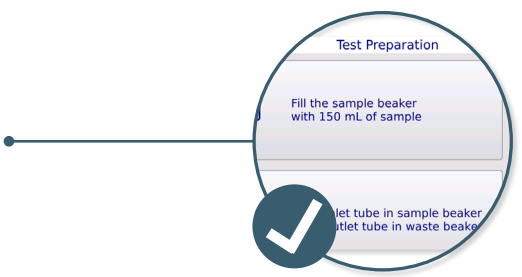


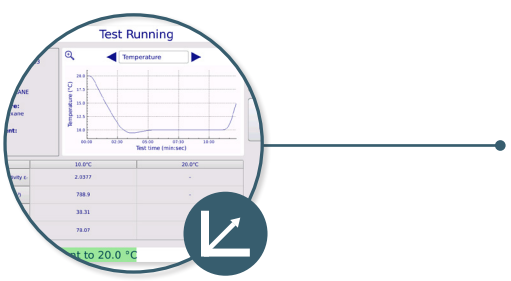
Cost Saving

- Small footprint requiring minimal lab space
- Low operator time due to simplicity of set up and automation, reducing labour costs
- Easy to maintain, service and calibrate in the field, eliminating time and costs associated with sending the instrument to a service centre
- Fast test results reduces overall instrument time, reducing the electricity required

Ease Of Use

- Features simple user interface with touch screen and real time display of test progress
- The fully automated test and closely integrated instrument means minimal operator knowledge is required with no extensive training
- Results are stored internally and can be exported directly to a USB, using the QR code or LIMS





Precision and Accuracy

- Fully automatic test sequence and consistent sample handling ensures test repeatability and reproducibility
- Possible missed steps or operator bias are eliminated for precise results

Test Method

- An Energy Institute Task Group has developed a new standard test, IP 628, specifically for aviation fuel which addresses the technology and needs gap of the existing method, ASTM D924 which was identified in CRC report AV-29-20
- IP 638 Determination of Relative Permittivity (Dielectric Constant) of Aviation Fuel, Small Scale Automated Temperature Scanning Method was approved and published in 2023 with full precision. It was developed from proposed method IP PM-FC

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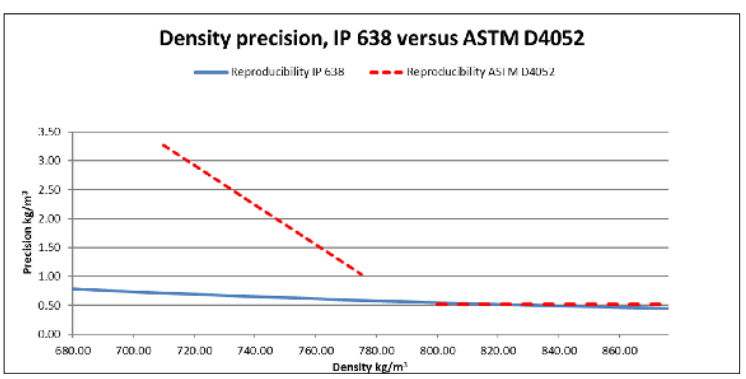
Technical Specifications

JetDC 88500-0	
Operation	
Dielectric constant	
Dielectric constant (κ) measurement range	1.000 to 2.500
Method of measurement	Relative permittivity
Dielectric constant precision (repeatability)	0.0007 at 2.15 (example)
Dielectric constant precision (reproducibility)	0.0012 at 2.15 (example)
Density	
Density range (Kg/m^3)	1 to 900.0
Method of measurement	Oscillating U-tube method
Densitiy precision (repeatability)	0.3 kg/m^3 at 800 kg/m^3
Densitiy precision (reproducibility)	0.5 kg/m^3 at 800.0 kg/m^3
Controlled temperature (°C)	0 to 40 (with chiller - 40 °C)
Sample size	150 mL
Test time	30 minutes (typical)
Data Management	
Display	9.7" real time on screen test progress and results
Results storage	Results stored in internal memory
Results download	CSV, PDF
Interface	
User interface	LCD touchscreen
Data input/output	LIMS compatible, Ethernet, RS232, USB, QR code
Printer options	RS232, Ethernet
Power requirements	
Voltage	100/240 V, 50/60 Hz
Power	300 W
Physical	
Size (HxWxD)	430 x 265 x 340 mm
Weight	16.8 kg



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