Dielectric Material Analyzer

SPECTANO 100 - 5 µHz to 5 kHz

Quick analysis of dielectric & semiconducting materials:

- Polymers, epoxy, insulation papers/celluloses, glass or thin films
- Dielectrics used as insulations in cables and high voltage assets
- Insulation liquids like mineral oils or silicones
- Nanomaterials, nanocomposites and other material composites
- Polymers or monomers used in sensors or medical materials and biomaterials

Measures permittivity ε, C, R, tanδ, power factor, polarization, conductivity and a lot more

OMICRON LAB

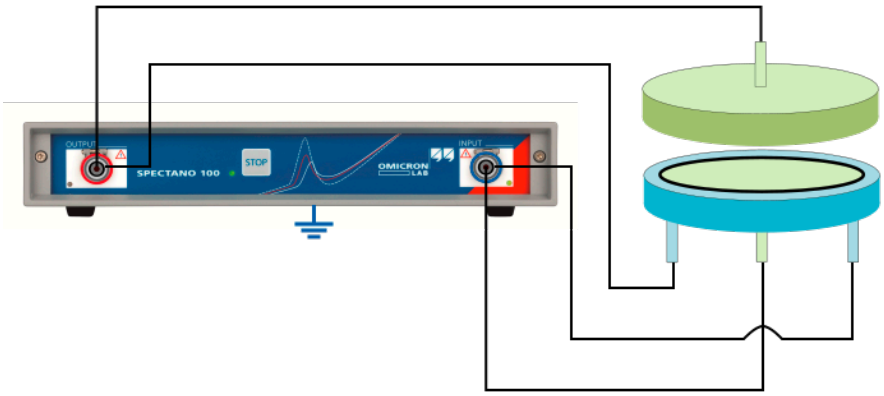
Smart Measurement Solutions®

SPECTANO 100

SPECTANO 100 helps you to analyze dielectric properties of liquid and solid insulation or semiconducting materials. Whether you are a chemist, HV specialist, or manufacturer, the dielectric properties, specifically measured at low frequencies, are very important. They help to understand the relationship between the chemical structure and the electrical characteristics of a material. This helps to reveal aging effects and structural changes due to environmental influences. Usually electrical material test systems are divided into two main testing methods:

- Time-domain systems to determine the polarization phenomena (PDC)
- Frequency Domain Spectroscopy (FDS)

SPECTANO 100 **combines these methods in one device** offering a frequency range from **5 µHz to 5 kHz.** With its wide output voltage range from **100 mV$_{peak}$ to 200 V$_{peak}$** it enables you to analyze a wide range of dielectric material parameters.



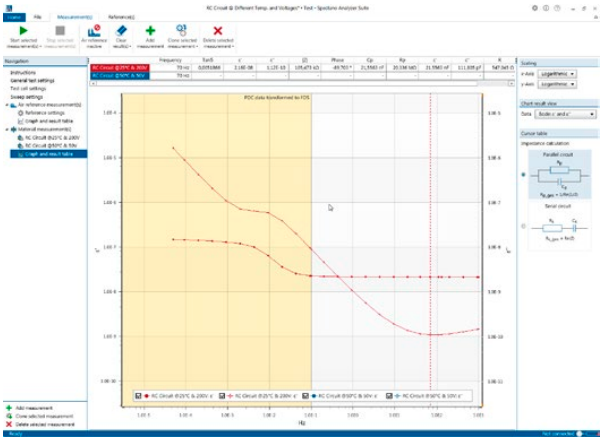
SPECTANO Analyzer Suite (SAS)

The SAS software is an **intuitive** user interface for the **easy analysis and visualization of results**. It allows you to extract all required parameters from your measurements or to compare different measurements.

The SAS offers a **high variety of charts** like

- Time domain,
- Frequency domain or
- Cole-Cole plots

that will allow you to visualize your results just the way you need them.



Automatic calculations of vacuum capacity C_0 and permittivity ε are available for different test cell topologies.

An **automatic compensation of parasitic capacitances (e.g. stray capacitances)** based on an air or reference material measurement ensure an easy handling and accurate measurement results.

Your Key Benefits

Reduce equipment cost

SPECTANO 100 uniquely combines two test methods in one small device.
FDS and PDC analysis enables measuring different material phenomena without the need of an additional analyzer. For most applications, the high output voltage allows measurements without the need of an additional voltage booster. This makes the SPECTANO 100 a low-cost all-in-one system.

Exchange data easily

The SPECTANO Analyzer Suite does not require a license and can be installed on as many PCs as you like. This enables you to easily share and analyze data with customers or colleagues working at different locations.

Reduce measurement time

The FDS measurement is feasible for high frequencies but takes very long at low frequencies (t = 1/f). The SPECTANO 100 combines the PDC measurement in the time domain with the FDS measurement using a Fourier transformation to reduce the measurement time up to 70 % compared to exclusive FDS measurements.

Automate your measurements

SPECTANO 100 can be controlled via an automation interface (API). Use .NET or COM compatible systems like Visual Basic, C#, MATLAB or LabView to solve your specific topics. An analysis of curing processes or influences of different voltages can now easily be performed using the automated Continous Wave Recorder.

Integrate the device easily into existing test systems

Optional adapters and the triaxial connection system enable a flexible connection of common test cell topologies or potential free measurements in grounded applications. Temperature resistant cables allow to connect the SPECTANO 100 to test cells located in a temperature controlled environment.

Increase efficiency

The SPECTANO Analyzer Suite provides different pre-measurements to check the setup. Errors in the system or settings can be detected before starting a measurement of several hours.

Technical Data

Output current

Voltage range	± 100 mV_{peak} to ± 200 V_{peak}
Measurement current	max. 50 mA_{peak}

Frequency range

FDS mode	5 µHz to 5 kHz
PDC mode	20 µHz to 100 mHz
Combined mode	20 µHz to 5 kHz

Measurement range

Impedance	100 Ω to 20 TΩ
Capacitance	10 pF to 100 µF

Measurement accuracy at 23°C ± 5°C

Capacitance [2]	0.5 % + 1 pF
PDC current	0.5 % ± 1 pA
Tanδ [3]: f < 1 mHz	2 % + $5x10^{-4}$
Tanδ [3]: 1 mHz < f < 100 Hz	1 % + $3x10^{-4}$
Tanδ [3]: f > 100 Hz	2 % + $5x10^{-4}$

PC requirements

Operating system	Windows 10
CPU	Current Intel or ADM CPU
RAM	min. 2 GB
Interface	USB 2.0 or higher

General

DRA AC power supply	100 V to 240 V_{AC} / 50 Hz to 60 Hz
Dimensions (w x h x d)	260 x 50 x 256 mm 10.25 x 2 x 10.5 inch
Weight	2.3 kg / 5 lb

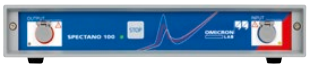
Supported standards

IEC	62631-3-1 (2017); 62631-2-1 (2018) [4]
ASTM	D150; D924

2 Capacitance accuracy for frequencies 100 mHz to 5 kHz
3 Tanδ accuracy for capacitances ≥ 100 pF
4 Former IEC 60250 (1969)

Order Numbers

OL000400 **SPECTANO 100 Dielectric Material Analyzer**



Delivery includes:
SPECTANO 100 device, DTS1 dielectric test sample box, grounded DRA power supply, Lemo low noise triaxial cables, USB cable, carrying case, Quick Start Guide and CD ROM with SAS

OL000453 **Test cell for solid materials**

Disk electrodes with Guard ring to analyze solid insulation materials

OL000452 **Triaxial to BNC adapter cables**

to connect test cells with BNC connections

OL000451 **Triaxial to 4 mm adapter cables**

to connect test cells with 4 mm connections

V6 -2002 / L2882