

Features

- Open-ended coaxial line sensor
- Frequency range 100MHz to 10GHz
- Wide temperature range from 0°C to 80°C
- Low heat capacity by thin aperture (0.6mm)
- Integrated class A Pt100 thermocouple (optional)
- Conform to food contact regulations
- Convexly shaped aperture plane
- 3.5mm high precision female connector
- Plastic protection and fixing cap

Applications

- Broadband dielectric spectroscopy
- Material measurement
- Suitable for liquids, pasty, soft & semi-solid materials

Description

The SDM-10G open-ended coaxial line sensor is a high-performance probe suitable for assessing complex dielectric properties of liquids, pasty and semi-solid materials. The probe is manufactured in a high accuracy production process and can be used within a frequency range from 100MHz to 10GHz.

The probe is applicable in a temperature range from 0°C to 80°C. Due to its thin aperture it has a very low heat capacity and therefore adapts quickly to the samples temperature and reduces erroneous results caused by temperature variations. Furthermore, the SDM-10G can be shipped with a Pt100 thermocouple enabling the user to monitor the actual temperature of the sample and to compensate for temperature influences.



Basically, the SDM-10G probe was developed for food quality assessment; therefore, it is manufactured from materials compliant to food contact regulations and consequently can be applied in food industry applications.

The probe has a convex aperture plane. Dielectric measurements are very vulnerable against air inclusions within the measurement volume, generally leading to falsified results. By using a convexly shaped probe the contact between sensor and material* is improved and therewith leads to more precise results.

The SDM-10G is equipped with a 3.5mm precision female connector[†] for ensuring a high-quality RF connection to 10GHz. The probe can be used in combination with any network analyzer or time domain reflectometer covering the frequency range of interest. For protecting the RF connector and to fix the probe in a mount, the probe is shipped with a removable plastic cap.

* In case of deformable materials

[†] Compatible to 2.92mm and SMA connectors

Mechanical Specification

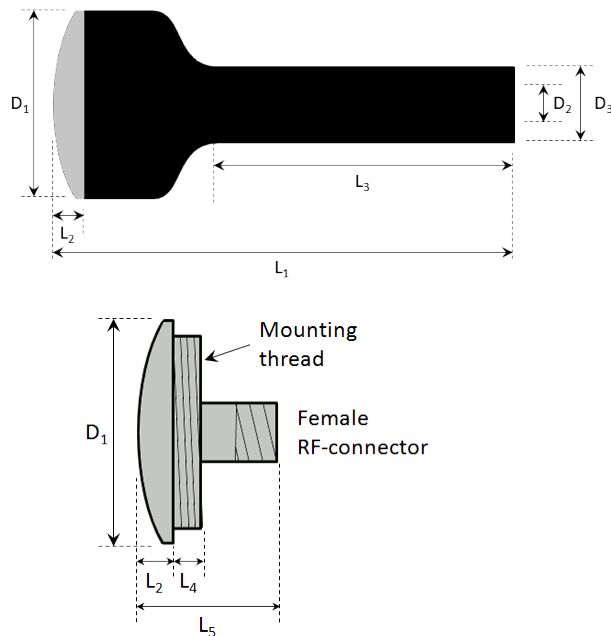


Table 1: Dimensions

Parameter	Description	Value [mm]
L1	Overall length	84.0
L2	Visible metal part length	4.0
L3	Mounting part length	55.0
L4	Thread length	3.5
L5	Coaxial line length	20.0
D1	Overall diameter	31.0
D2	RF cable lead-through diameter	12.0
D3	Mounting part diameter	15.0
-	Mounting thread	
-	RF connector	3.5

Probe Materials

Table 2: Probe materials

Part	Material
Aperture plane	Passivated stainless steel
Plastic cap	Polyoxymethylene (POM)
Inner conductor	Passivated stainless steel
Isolator	Cross-linked polystyrene

Dielectric Measurements

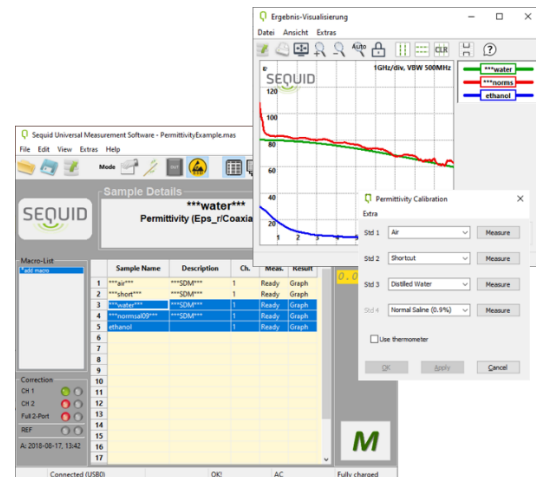


Figure 1: Sequid material measurement software

The SDM-10G coaxial probe is suitable for the determination of complex permittivities within a wide frequency range. The explicit calculation of the permittivity from the reflection coefficient is described in literature; however, it is not a trivial task. For the calculation of the permittivity it is necessary to measure known calibration standards (e.g. air, water, shortcut) with well-known characteristics.

In addition to the SDM-10G probe Sequid provides a material measurement software (see Figure 1) which



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SDM-10G

Dielectric Coaxial Probe

is adaptable to a wide range of laboratory equipment, most commonly vector network analyzers.

The software automatically calculates the frequency dependent complex permittivity based on a previously performed calibration. The software features a built-in calibration routine for performing the required calibration with known standard materials. Moreover, it is suitable for managing sample lists and includes convenient export filters for interfacing with other software formats. For further assistance please contact us via our [website](#) or by calling us directly.



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Dielectric Coaxial Probe

Ordering Information

Table 3: Available part numbers

Part number	Description	RoHS	Temperature range
SDM-10G	Convex aperture plane	✓	0°C to 80°C
SDM-10G-T	Convex aperture plane, Pt100 temperature sensor	✓	0°C to 80°C

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