

DAK

DAK (4 MHz - 67 GHz)

Fast & Precise Dielectric Measurements

This precision dielectric measurement system is designed to cover the 4 MHz – 67 GHz frequency range with three open-ended coaxial dielectric probes. The system uses advanced algorithms and novel hardware to measure the dielectric properties of liquids, solids, and semi-solids over a broad range of parameters. The measurement method is fast and non-destructive to the material under test. The sample volume should be large enough to ensure that reflections at the sample boundaries do not significantly influence the measurements. The minimum sample volume depends on the frequency, probe size, and dielectric parameters.



System	DAK consists of three single probes that cover the very broad frequency range from 4 MHz to 67 GHz without compromise on uncertainty. The probes are mounted on a mounting arm and connected via a high-quality cable to any vector network analyzer (VNA). DAK is designed to measure the dielectric properties of homogeneous and isotropic liquid, solid, and semi-solid materials.
Application	Application examples include: <ul style="list-style-type: none">▪ Characterization of materials for the electronics, chemical, food, and medical industries▪ Measurement at high frequencies with excellent precision; broad frequency range coverage enables measurement of dielectric relaxation in a variety of materials

DAK 12 (4 MHz - 3 GHz)



- Probe connector type: 3.5 mm male
- Outer conductor inside diameter: 12 mm
- Inner conductor diameter: 3.18 mm
- Flange diameter: 48 mm
- Dielectric bead material: Eccosotck 0005
- Flange: Stainless steel
- Immersible length: 50 mm
- Robustness: High resistance to corrosive materials
- Operating temperature range: 0 – 60 °C
- High measurement repeatability (typ. within ± 1%)
- Accuracy: Uncertainty tables based on material properties and frequency are available upon request

DAK 3.5 (200 MHz - 20 GHz)



- Probe connector type: 3.5 mm male
- Outer conductor inside diameter: 3.5 mm
- Inner conductor diameter: 0.93 mm
- Flange diameter: 18 mm
- Dielectric bead material: Eccostock 0005
- Flange: Stainless steel
- Immersible length: 50 mm
- Robustness: High resistance to corrosive materials
- Operating temperature range: 0 – 60 °C
- High measurement repeatability (typ. within ± 1%)
- Accuracy: Uncertainty tables based on material properties and frequency are available upon request

DAK 1.2E (5 GHz - 67 GHz)



- Probe connector type: 2.4 mm / 1.85 mm male (DAK-1.2E)
- Outer conductor inside diameter: 1.2 mm
- Inner conductor diameter: 0.28 mm
- Flange diameter: 18 mm
- Dielectric bead material: Epoxy
- Flange: Stainless steel
- Immersible length: 30 mm
- Robustness: High resistance to corrosive materials
- Operating temperature range: 0 – 50 °C
- High measurement repeatability (typ. within ± 1%)
- Accuracy: Uncertainty tables based on material properties and frequency are available upon request

Calibration

Calibration is performed according to SPEAG's high-quality standards; DAK probe calibration included within the scope of SPEAG's [ISO/IEC 17025 accreditation](#); suitable for measurements with small and known tolerances.

Verification

The [DAK Verification Kit](#) provides a quick and easy tool to verify the measurements made by the Dielectric Assessment Kit.

Accessories

SPEAG provides all [DAK components and accessories](#) necessary for high-precision measurements:

- Shorting block
- Probe stand
- Metallic strip set (MSS)
- Thermometer
- High precision cables to connect probe beam to the VNA port

VNA Compatibility	DAK is compatible with the most popular VNA on the market; please see our list of currently supported VNAs .
Software	<p>The software provides the following functionalities:</p> <ul style="list-style-type: none"> ▪ Modern intuitive graphical user interface (GUI) ▪ Choice of complex permittivity parameters (ϵ', ϵ'', σ, $\tan \delta$) reported in a variety of data formats: linear plots, logarithmic plots, Smith charts, Cole-Cole plots, and tabular ▪ Robust data analysis suite enables data to be fitted to analytical curves and to be compared with target parameters with tolerance and uncertainty ranges ▪ Streamlines the workflow for dielectric measurements ▪ Fast and robust VNA control, data acquisition, and calculation of dielectric parameters ▪ Includes averaging function and numerical noise filtering ▪ Flexible scripting for measurement automation and hardware customization
Computer Requirements	<p>The following computer requirements must be met:</p> <ul style="list-style-type: none"> ▪ Software must run on an external computer, not on the VNA ▪ Intel Core2 Duo 2.3 GHz CPU (or AMD equivalent) ▪ 4 GB of RAM ▪ Dedicated 3D accelerated graphics display adapter card with at least 128 MB of on-board memory that supports the latest OpenGL drivers (v3.2 or higher); note: graphics cards of the AMD Radeon™ HD 7500M/7600M Series must run on the latest driver version ▪ Operating system: Windows 11, Windows 10, Windows 8 and 8.1, or Windows 7; Windows 8.1 is recommended; software is running only on 64 bit Windows operating system ▪ A display with 32-bit color depth and a resolution of 1280 × 1024 pixels or better (optimum size: 1920 × 1200 pixels)
Unique Features	
State of the art probe design	Obtaining good contact with fluids, gels, and bulk solids
Advanced shorting block	Achieving excellent calibration
Python Interface	Built-in Python interface for powerful extended control of equipment and data analysis
Wide range of Dielectric Properties	<ul style="list-style-type: none"> ▪ ϵ_r: 1 – 800 ▪ $\tan \delta$: 0.02/ ϵ_r – >10
Benefits	

Broad Band	Delivers outstanding performance from 4 MHz to 67 GHz over a wide permittivity range
Easy to Use	<ul style="list-style-type: none"> ▪ Enhanced user experience with improved GUI and software ▪ Quick and easy to operate reducing product training time ▪ Fast accurate measurements ▪ Semi-automated measurements at a push of a button
Accurate, Repeatable, and Reliable	<p>Measurement uncertainty as a function of frequency and material properties</p> <p>Suitable for measurements with small and known tolerances</p>
Compatibility	Compatible with the DASY 6.x and SEMCAD X softwares.
Product History	The operational frequency range of DAK1.2 is extended up to 67 GHz in DAK1.2E
Release Date	Released

Copyright © 2010–2025 Schmid & Partner Engineering AG