

## DAK3.5-TL-P: 200 MHz – 20 GHz

### Fast and Precise Dielectric Measurements of Thin Layers

#### Description



The DAK3.5-TL-P system was developed to measure the dielectric properties of thin material layers, sheets and foils in the millimeter and sub-millimeter range and of liquids available in small quantities (0.5 – 50 ml). The frequency range is 200 MHz – 20 GHz. The system is fully automated and software controlled: the automated sample platform brings the material under test to the probe and measures the sample thickness with micrometer precision. The applied force can be precisely controlled to enable high measurement repeatability for soft samples such as leather or soft plastic.

#### Applications

- evaluation of raw printed circuit board materials
- characterization of microwave substrates, antenna materials and covers
- analysis of dielectric materials for electronic components, e.g., capacitors, coils, and resonators
- characterization of liquids available in only small quantities, e.g., precious pharmaceutical or biochemical samples
- evaluation of small biological samples, e.g., human skin or tumor tissue samples

#### Components

- 1 DAK-TL-P Base System
- 1 DAK3.5-TL Probe Beam (200 MHz – 20 GHz)
- 1 Set of Calibration Standards
- 1 Set of Metal Plates for Liquids (5 pcs)
- 1 High Precision 26 GHz Cable (PC3.5 F connectors, 1 m long)
- 1 DAK-TL Measurement Software V2 incl. Manual

#### Accuracy

- typ. < 3%
- novel algorithms for finite sample thickness
- improved flange design to minimize resonances
- new short to ensure precise calibration
- high measurement repeatability (typ. within +/- 1%)

## Base System



The DAK-TL-P Base System accommodates the automated sample platform with built-in thickness measurement, the force sensor, and the controlling electronics. The base system is connected to the PC via USB and is fully automated and software controlled. The sample is placed on the sample platform, which brings it to the probe for measurement of the sample thickness with micrometer precision. The base system is designed for use with all three DAK-TL Probes.

Thickness Measurement Range: 0.1 – 10 mm

Thickness Measurement Precision: <0.003 mm (preliminary specification)

Force Measurement Range: 0 – 1000 N

USB Connector: Type B

Weight: ~16 kg

Operating Temperature Range: 10 – 50 °C

## DAK3.5-TL Probe Beam



Connector Type: 3.5 mm male

Outer Conductor Inside Diameter: 3.5 mm

Inner Conductor Diameter: 0.93 mm

Flange Diameter: 48 mm

Dielectric Bead Material: Stycast ( $\epsilon_r = 2.54$ )

Flange: Stainless steel

Beam Dimensions: 40 × 30 × 350 mm

Robustness: High resistance to corrosive materials

## Calibration

Calibration is performed according to SPEAG's high-quality standards; ISO/IEC 17025 scope extension is in progress.

## Software

Embedded in the same graphical user interface as the DAK packages, the [software](#) delivers similar user experience.

- modern intuitive graphical user interface
- 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

## VNA Compatibility

DAK-TL-P is compatible with the most popular vector network analyzers (VNA) on the market as our DAK probes; please see our list of [currently supported VNAs](#). Attractive system packages with the VNAs from Rohde & Schwarz are available upon request.

## Upgrade Options

Extend the lower frequency to 10 MHz:

1 [DAK-12-TL](#) Probe Beam (4 MHz – 3 GHz)

Extend the upper frequency to 67 GHz:

1 [DAK-1.2E-TL](#) Probe Beam (5 – 67 GHz)

1 high-precision cable (PC2.4 or 1.85 F connectors, 0.5/0.4 m long)

## Ordering

Please request a quotation from your nearest [SPEAG representative](#) or contact us at [info@speag.com](mailto:info@speag.com).

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