COAXIAL DIELECTRIC PROBE System (CDP/B0.5-40/L30)

DATA SHEET

Version 1.0, April 2020

Components

The coaxial dielectric probe system comprises the following components:

- **Probe**, which is constructed from:
  - Semi-rigid coaxial cable
  - 2.9mm female (K) connector
  - Brass flange
- **Short Circuit Plate**
- **Software**, which includes:
  - Data table,
  - Interpolation and look-up program,
  - Graphical User Interface (GUI).

All components are accommodated in an oak box.

Probe Assembly

Technical Specifications

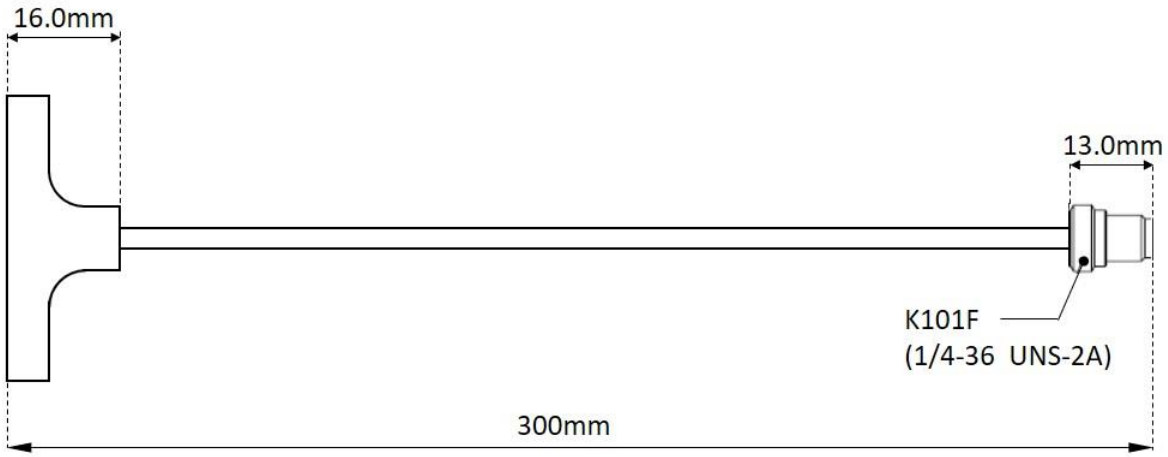
Bandwidth	500MHz to 40GHz (reduced bandwidth options available).
Permittivity range	Real part of relative permittivity must lie in range 1.0 to 200. Imaginary part of relative permittivity must lie in range 0 to 100.
Accuracy (1)	Real part of permittivity $\leq$ 5% (2) Imaginary part of permittivity $\leq$ 5% (2) or 0.003, whichever is the greater.

(1) Accuracy is dependent on accuracy of VNA calibration, short-circuit reference and sample placement; the latter two depend on the skill and diligence of the user.

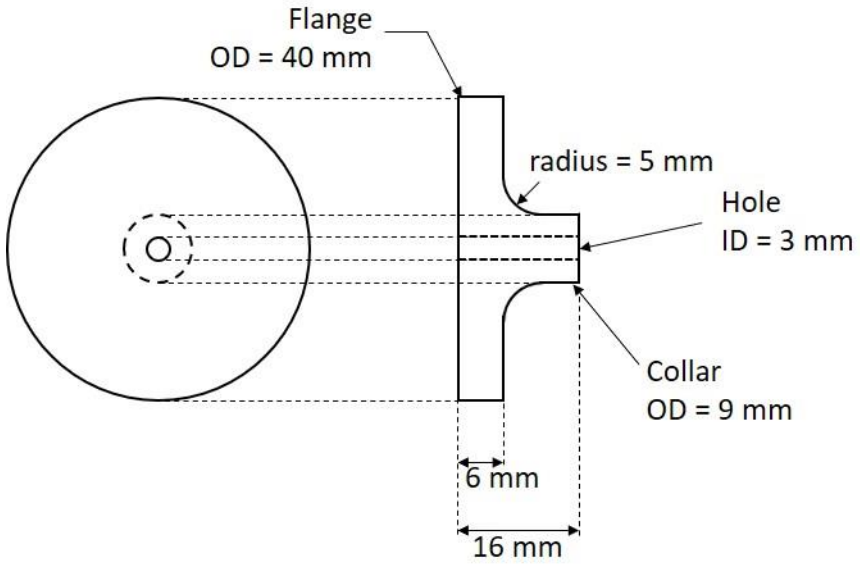
(2) 5% is worst case, typical accuracy is better than 2.5% in both real and imaginary parts of permittivity.

Outline Diagrams

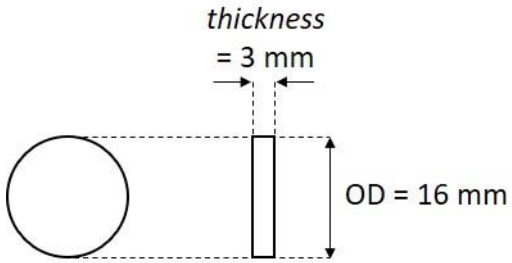
An outline diagram of the probe assembly is given below.



An outline diagram of the brass flange is given below.



An outline diagram of the brass short circuit plate is given below.



Semi-rigid Coaxial Cable

The semi-rigid coaxial cable is series K120 and has the following parameters.

Type	Semi-rigid coaxial, tin or tin/bismuth plated copper outer conductor, silver plated copper centre conductor.
Impedance	$50 \pm 2\ \Omega$
Dielectric Type	Microporous PTFE
Dielectric Constant	1.687
Relative velocity	0.78
Outside Diameter	2.95 mm
Centre Conductor Diameter	0.81 mm
RF Connector	2.92 mm female Compatible with sma and 3.5mm connectors.

Software

Data table	Matlab data table, 43.2MB (for full bandwidth of 0.5-40GHz)
Interpolation	Matlab file, 4KB
GUI	Matlab file, 4KB
User Instructions	PDF, 253KB

Available in various media (default is memory stick) or downloadable from WHR website (requires licence).