

DATA SHEET

# Dielectric and Alumina Supports

## Dielectric Supports

Dielectric supports can be used with all disc or cylinder type Dielectric Resonators (DRs) to improve coupling and temperature stability. Contact us for other support configurations.

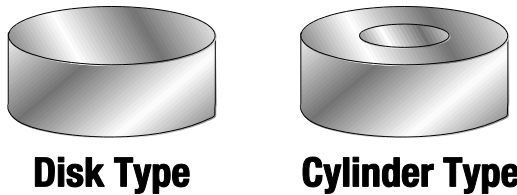


Figure 1. Disk and Cylinder Types

**Note:** For disk type support, only use the  $D_s$  and  $L_s$  dimensions.

Table 1. Available Materials for  $D_s$  ( $\pm 0.005$ )/ $L_s$  ( $\pm 0.001$ )

$D_s$ ( $\pm 0.005$ )	$d_s$ ( $\pm 0.004$ )	$L_s$ ( $\pm 0.001$ ) Increments of 0.010	Available Materials
0.472	0.158	0.040–0.410	D4, D6
0.394	0.158	0.040–0.315	
0.315	0.158	0.040–0.150	
0.236	0.118	0.050–0.100	
0.138	0.079	0.020–0.100	
0.120	0.079	0.020–0.090	

Table 2. Available Materials for  $D_s$  ( $\pm 0.002$ )/ $L_s$  ( $\pm 0.002$ )

$D_s$ ( $\pm 0.002$ )	$d_s$ ( $\pm 0.004$ )	$L_s$ ( $\pm 0.002$ ) Increments of 0.005	Available Materials
0.120		0.020–0.100	Alumina
0.142	0.075	0.039	
0.170	0.098	0.059	
0.317 ( $\pm 0.005$ )	0.125	0.080	

## Alumina Supports

### High Frequency Applications

For high frequency applications (above 6 GHz), TTI offers a special grade of alumina with the properties listed in Table 3.

Table 3. Material Characteristics—Alumina Supports for High Frequency Applications

Item	Value
Composition	Alumina
Dielectric Constant	7.6
Dielectric Loss	<0.0006
Volume Resistivity ( $\Omega$ cm) at 20°C	$2 \times 10^{10}$
Thermal Conductivity (cal/cm-sec °C) at 25°C	0.042
Water Absorption	<0.04

### Cellular and PCS Applications

For cellular and PCS frequencies, we offer a different grade of alumina with the properties listed in Table 3.

**Note:** Contact TTI's factory for available sizes.

Table 4. Material Characteristics—Alumina Supports for Cellular and PCS Applications

Item	Value
Composition	Alumina
Dielectric Constant	9.5
Dielectric Loss	<0.001
Temperature Coefficient of ( $\tau f$ ) (ppm/°C)	114
Volume Resistivity ( $\Omega$ cm) at 20°C	$10^{16}$
Coefficient of Thermal Expansion (ppm/°C) (25°C – 200°C)	6.5
Thermal Conductivity (cal/cm-sec °C) at 25°C	0.08
Water Absorption	<0.01

## D4 and D6 Supports for High Frequency Applications Ordering Information

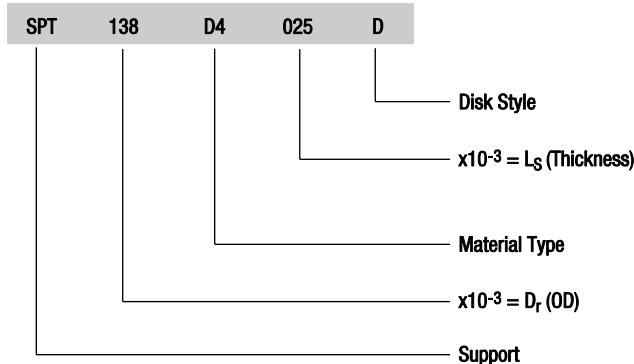


Figure 2. SPT-138-D4-025D Disk Type Example

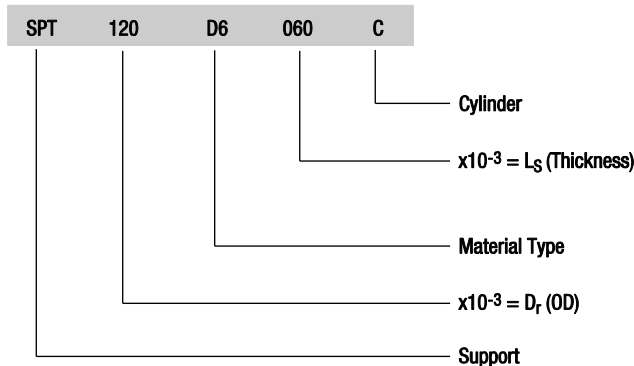


Figure 3. SPT-120-D6-060-C Cylinder Type Example

Table 5. Material Characteristics—D4

Item	Value
Composition	Cordierite (Mg, Al, Silicate)
Dielectric Constant	4.5
Dielectric Loss	<0.002
Temperature Coefficient of (εf) (ppm/°C)	100
Volume Resistivity (Ω cm) at 20°C	10 <sup>14</sup>
Coefficient of Thermal Expansion (ppm/°C) (25°C – 200°C)	2.4
Thermal Conductivity (cal/cm-sec °C) at 25°C	0.10
Water Absorption	<0.01

Table 6. Material Characteristics—D6

Item	Value
Composition	Forsterite (Mg, Silicate)
Dielectric Constant	6.3
Dielectric Loss	<0.002
Temperature Coefficient of (εf) (ppm/°C)	107
Volume Resistivity (Ω cm) at 20°C	10 <sup>14</sup>
Coefficient of Thermal Expansion (ppm/°C) (25°C – 200°C)	2.4
Thermal Conductivity (cal/cm-sec °C) at 25°C	0.009
Water Absorption	<0.6

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