# Guidelines/recommendations
## "Measuring the thermal conductivity and thermal resistance of prepregs und bonding sheets" (the user is responsible for implementation)

**Objective:**

➢ **Measuring thermal conductivity λ in [W/mK] and thermal resistance $R_{th}$ in [K/W]**

**Methods:**

➢ **Test method ASTM D5470 or ASTM D5470 equivalent (guarded hot plate method; TIM tester)**

**Parameter recommendations:**

➢ **Sample construction:**
  - ➢ **Prepregs sandwiched between 35 μm Cu foil**
  - ➢ **Prepreg with glass fibre type 106**
  - ➢ **Total prepreg thickness 200 – 400 μm (*), i.e. sandwich several sheets together**
➢ **Temperature difference ΔT > 10 K and thermal flux Q: 1-20 W (*)**
➢ **Measurement temperature: 50 – 60°C**

**(*) The sample thickness should be adjusted according to the thermal conductivity of the material to satisfy the conditions for ΔT and Q**

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# Equations

**Thermal resistance $R_{th}$:**

$$R_{th} = \frac{\Delta T}{Q} \qquad \left(\frac{K}{W}\right)$$

**Thermal conductivity $\lambda$:**

$$\lambda = \frac{d}{A \cdot R_{th}} = \frac{d}{A} \cdot \frac{Q}{\Delta T} \qquad \left(\frac{W}{m \cdot K}\right)$$

**Use the following equation to calculate the thermal conductivity of prepregs/bonding sheets from the total thermal conductivity of the multi-layer composite:**

$$\lambda_S = \frac{d_S}{\sum\limits_{i}^{n} \frac{d_i}{\lambda_i}}$$

$\lambda$: Thermal conductivities
d: Layer thicknesses
i: Index of each layer (n layers)

$\lambda_S$ : Thermal conductivity of the multi-layer composite
$d_S$ : Total thickness of the multi-layer composite

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