# Test Specifications

**Title:** Thermal Conductivity

**ASTM Standard:** N/A

**Equipment:** Hot Disk Thermal Constants Analyser

**Test Description:** Laird Technologies measures thermal conductivity of final products using the Hot Disk Thermal Constants Analyser. Based on the theory of the Transient Plane Source technique, the Hot Disk Thermal Constants Analyser utilizes a sensor element in the shape of a double spiral (see photo below).


This sensor acts both as a heat source for increasing the temperature off the sample and a "resistance thermometer" for recording the time dependent temperature increase. This spiral is supported by kapton for protection and electrical insulation. The sensor is sandwiched between two halves of the sample (see diagram below). During a pre-set time, 200 resistance data points are taken and from these the relation between temperature and time is established. A few parameters, like "Output of Power" to increase the temperature of the spiral, the "Measuring Time" for recording 200 points and the size of the sensor are used to optimize the settings for the experiment so that thermal conductivities from 0.01 W/mK to 400 W/mK can be measured.

## Hot-Disk Operation

- Probe sandwiched between two samples.
- Allow sample and probe to come to thermal equilibrium.
- Determine appropriate wattage and time.  (Trial and Error)
- Heat applied to probe.
- Temperature increase is measured.
- Thermal Conductivity calculated from Temp. Increase.