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Thermal Conductivity measurements on an *NPL* certified **Inconel 600** sample and **brass** sample at high temperatures with the Hot Disk Thermal Constants Analyser

High Temperature Measurements

The Hot Disk Thermal Constants Analyser comes with a wide range of high temperature accessories such as the circulating bath, furnace and furnace with insert for controlled atmospheres.

The furnaces and the circulating baths are fully automatically controlled via the PC making high temperature measurements very easy and time efficient. Power, measurement time, number of measurements at each temperature step, sample relaxation time and temperature precision are pre-programmed for each temperature step with the easy-to-follow software. After setting up the measurements and starting the sequence, the PC takes over full control and carries out all the measurements automatically.

Measurements at temperatures up to 700 °C are possible with specially designed MICA insulated Nickel sensors. In this application note an **Inconel 600** sample, certified by National Physics Laboratory (NPL) in the UK and a brass sample from an industrial maker were measured with the Hot Disk Thermal Constants Analyser. A thick-muffle furnace was used for heating the samples.

The measurements on the Inconel 600 sample were carried out with the following measurement parameters and a MICA insulated sensor S/N 4921 (9.7 mm radius).

Temperature [°C]	Repetitions	Power [W]	Measurement time [s]	Temperature precision [°C]
22	3	1	20	0.5
150	5	1	20	0.7
300	5	1	20	0.7
450	5	1	20	0.6
600	5	1	20	0.5

The measurements on the brass sample was carried out with these parameters (same sensor).

Temperature [°C]	Repetitions	Power [W]	Measurement time [s]	Temperature precision [°C]
150	5	3	5	0.7
300	5	3	5	0.7
450	5	3	5	0.6
600	5	3	5	0.5



The Inconel 600 sample, with the sensor and sample holder

The main reason for the shorter measurement time and the higher power is that the diffusivity of the brass sample is substantially higher than for the Inconel 600 sample.

