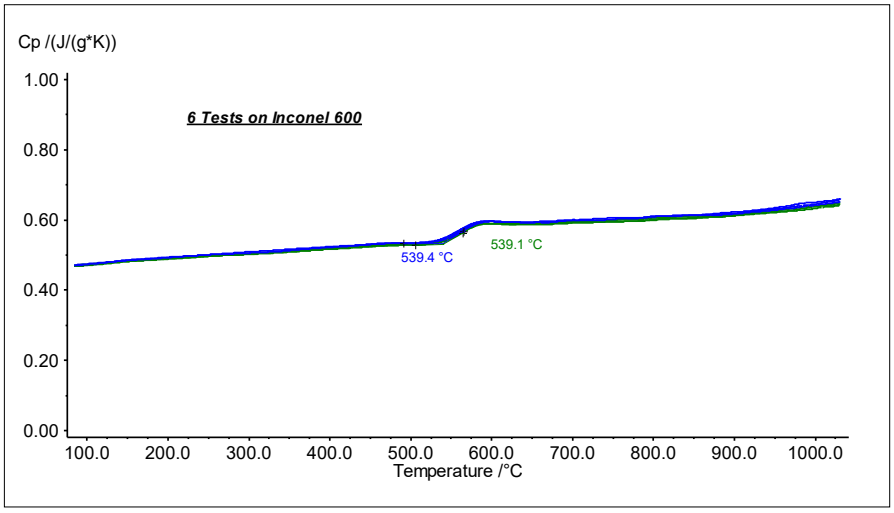
APPLICATION**SHEET**

Metals/Alloys · Aerospace
DSC 404 *Pegasus*®

Nickel-Based Superalloy (Inconel 600)

Introduction

Inconel alloys are a family of non-magnetic nickel-based superalloys. Inconel alloy 600 consists of 72% nickel, 16% chromium, and 8% iron. The high chromium content of Inconel 600 raises its oxidation resistance considerably above that of pure nickel while its high nickel content provides a good corrosion resistance under reducing conditions. Therefore, Inconel 600 offers high oxidation and corrosion resistance, even at very high temperatures, and also retains high mechanical strength under these conditions. It is therefore often used under extreme conditions, such as aircraft engine parts, turbocharger turbine wheels, chemical processing and pressure vessels. Inconel 600 & 800 are also used in the pressure tubes of CANDU nuclear reactors. Furthermore, Inconel 600 is a certified reference material for the thermal conductivity



Test Conditions

Temperature range:	RT ...1000°C
Heating rate:	20 K/min
Atmosphere:	Argon at 60 ml/min
Sample mass:	approx. 195 mg
Crucible:	Pt with lid
Sensor:	DSC type S

Test Results

Presented in the plot are the results of six different runs on the Inconel superalloy. The differences between the individual runs re in the range of ±2% which corresponds to the typical accuracy of the unit. At lower temperatures, a nearly linear increase in the specific heat results can be seen. Between 550 and 700°C, an endothermal step can be seen in the measured specific heat. This step can be explained by the formation of Ni_3Cr clusters causing an additional contribution to the specific heat (Richter and Born, 2004). It must be pointed out that the true specific heat is overlapped by the enthalpy change caused by the phase transition. Therefore, the measured data represents the apparent specific heat in this temperature range.

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