

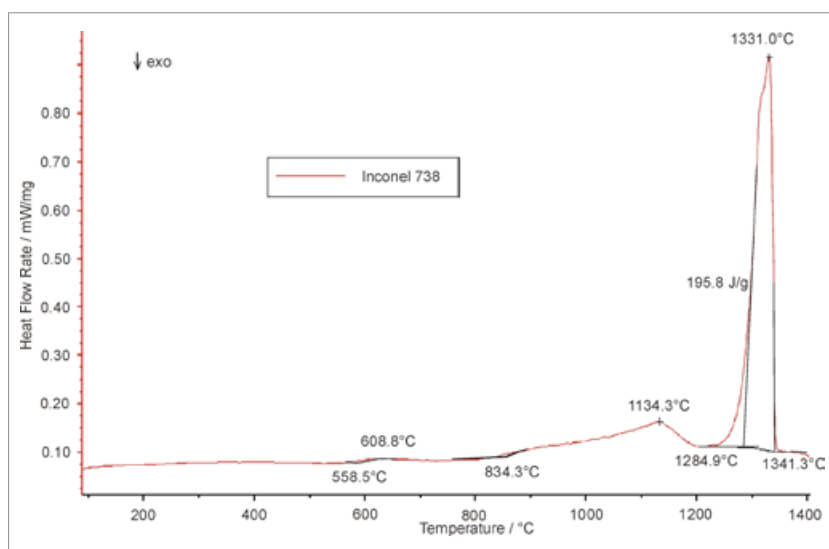
APPLICATION SHEET

METALS/ALLOYS – AEROSPACE

INCONEL 738

Inconel alloys are a family of non-magnetic nickel-based superalloys. Inconel alloy 738 is 60% nickel, 16% chromium, and 8.5% cobalt and other metals such as aluminum or titanium or tungsten in lower concentrations. The high chromium content of Inconel 738 raises its oxidation resistance considerably above that of pure nickel, while its high

nickel content provides good corrosion resistance under reducing conditions. Thus, it is often used under extreme conditions, such as aircraft engine parts, in turbine blades of gas power plants, turbocharger turbine wheels, chemical processing and pressure vessels.



Instrument

DSC 404 C Pegasus®

Test Conditions

Temperature range	RT ... 1375°C
Heating rates	20 K/min
Atmosphere	Argon at 60 ml/min
Sample mass	69.32 mg
Crucible	Pt with Al ₂ O ₃ liner +lid
Sensor	DSC type S

Results

Presented in the plot is the measured specific heat-flow rate of Inconel 738 alloy. Between 559 and 609°C, an endothermic step can be seen. This step can be explained by the formation of Ni₃Cr clusters causing an additional contribution to the specific heat (Richter and Born, 2004). At 834°C (extrapolated onset), a further endothermic phase transition was obtained. Melting was measured at 1285°C (extrapolated onset). The heat of fusion was 196 J/g.