

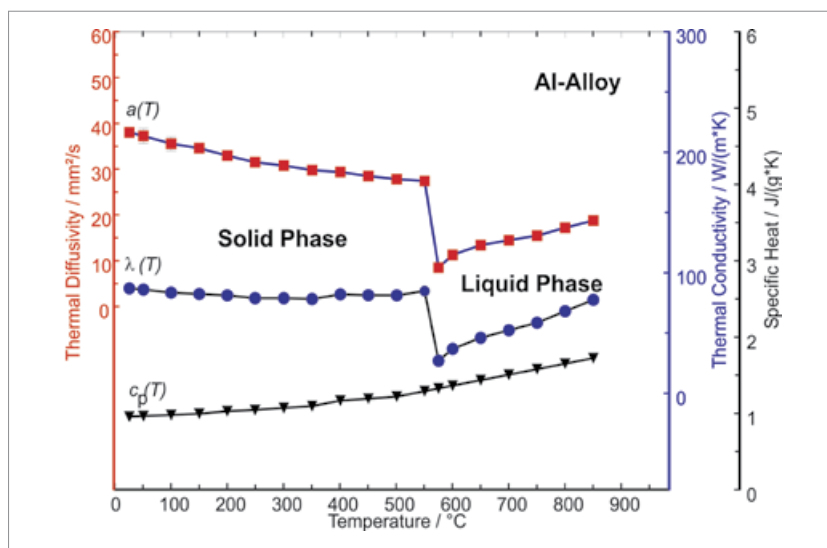
APPLICATION SHEET

LIQUID METALS – AUTOMOTIVE

ALUMINUM ALLOY (INCLUDING MELTING RANGE)

Reduced development times and costs, optimization of the manufacturing processes and lower masses in spite of increasingly higher demands on thermally stressed components are important goals of the automotive industry. For example, numerical simulations were used to predict the temperature distribution within the engine components during the casting process. A basic necessity is the knowl-

edge of the thermophysical properties of the casting material over the entire temperature range. In this application sheet, the measurement results of the thermophysical properties of an aluminum alloy are presented. The LFA measurements were carried out using a special sapphire container for measurement of liquid metals. The sapphire container ensures defined dimensions of the liquid.



Instrument

LFA 457 MicroFlash®

Test Conditions

Temperature range	RT ... 850°C
Sample holder	liquid metal
Sample thickness	1.454 mm
Sample surface preparation	sandblasted
c_p from DSC, standard	sapphire

Results

The thermal diffusivity and thermal conductivity show a nearly linear decrease above room temperature. A typical step in the thermal diffusivity/conductivity was detected for the phase transition (solid/liquid) above 550°C. The reason is the dissolution of the lattice structure during the phase transition and therefore a reduced electronic heat transfer. The example clearly demonstrates that the LFA method is not limited to solid materials with defined dimensions. The LFA 457 can analyze liquid metals without any problems.