



# Additive Manufacturing

High-speed Thermography for Process Control

**1,920  
x  
1,536**  
Detector

**Detector Format up to (1,920 × 1,536) IR pixel**  
Efficient measurement of smallest structures  
on large-scale objects

**≥ 15  
mK**

**Thermal Resolution up to 15 mK**  
Precise detection of smallest temperature  
differences

**105,000  
Hz**

**Frame Rate**  
Analysis of high-speed dynamic temperature  
changes and processes

**10  
GigE**

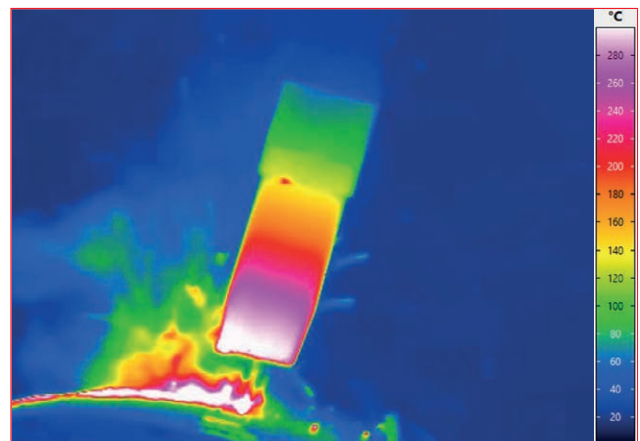
**10 GigE**  
Transmission and storage of large amounts  
of measurement data on a computer in very  
short time

**IP67**

**Protection Degree**  
Constant excellent optical and metrological  
performance even in harsh industrial  
environments

Temperature is one of the key factors the quality of the process and thereby also the quality of the final product depends on. Thermographic cameras can for example be integrated directly into a laser sintering machine. They allow users to measure various temperature related process parameters.

Most relevant are the detection of the temperature distribution of the powder bed surface and the measurement of the melting temperature. Both can be realised while the laser is in operation (in-situ measurement) and for temperature ranges more than 2,000 °C.

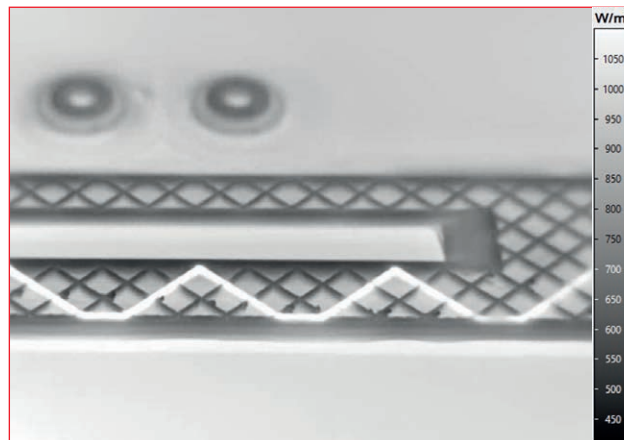


Thermal spraying

## Reliable Localisation and Detailed Mapping of Thermal Anomalies

By in-line monitoring of thermal process parameters, infrared cameras from InfraTec support the optimisation of additive manufacturing processes.

- Non-contact and non-reactive temperature measurement
- Mapping of heat flows in components to gain a complete understanding of the process
- Precise control of heating and cooling of the materials to be processed
- Monitoring of defined energy inputs and reduction of thermal load
- Precise thermal and even spatial control of the process due to high-speed data acquisition, high geometric resolution and delay-free triggering
- Complete recording, documentation and evaluation of temperature distributions to determine the optimum energy input by the laser



3D printing of a spindle holder

## Overview of InfraTec Services

- Cooled and uncooled high-end thermographic cameras for the solution of complex tasks
- Various detector formats with up to (1,920 × 1,536) IR pixels and wide temperature measurement ranges
- Modular design for optimal adaptation to the measurement and test situation (also OEM solutions available)
- Complete range of precision interchangeable lenses with first-class transmission quality
- Integrated solutions including accessories and software for R&D and process control
- First-class service to ensure high system availability
- Innovative measurement technology with more than 25 years of expertise



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