Active Thermography

for non-destructive quality evaluation in battery production.

Challenge, solution and benefit

The aim is to provide a non-destructive method to monitor welds in batteries without retroaction. Active thermography can measure the joined area of the tested weld directly. It is capable of detecting and localising sub-surface weld imperfection and therefore offers a basis for the continuous improvement of the welding process.

Technical solution

- Specimen is heated by a laser with a large spot size
- Infrared radiation emitted by the specimen’s surface is recorded by an infrared camera spatially and temporally resolved
- Sound and defective volume elements show a different thermal behaviour which leads to changes in the superficial temperature evolution
- An analysis unit evaluates the recorded signals, measures the overall joined area and shows flaws spatially resolved
- Detectable defects:
  - Lack of fusion
  - Cracks
  - Voids
Example

Thermographic quality valuation of laser joints

a) Weld within specification

b) Partially disbonded weld

Surface view of laser joints

Testing equipment setup

Sample shape

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