

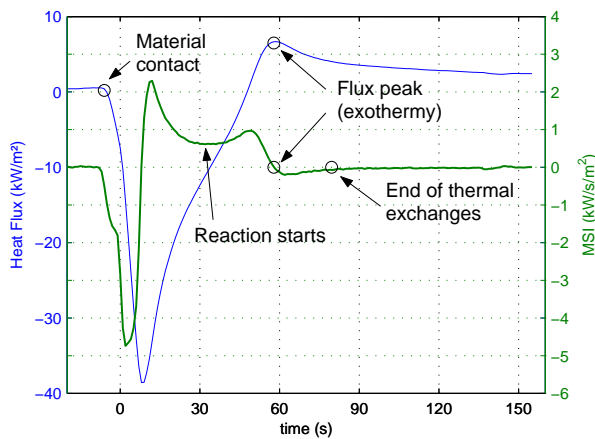


Goals: Cure monitoring for productivity increase with safe cure level (quality).

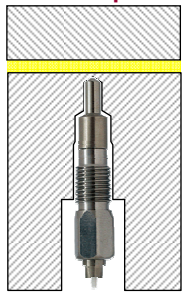
Applications: SMC, BMC, RTM, RIM, Injection, Liquid casting, Rotomoulding

Domains: Automotive, Electrical, Building.

Principle: Heat flux sensors allow contact less monitoring of heat transfer in metallic tools. Since most thermosetting materials generate heat during their reaction the sensor is sensitive to cure reaction. This information is exploitable for end of cure detection with appropriate real-time treatment.



Sensor positioning: The robust sensor measures the internal mold heat flux which is closely related to heat exchange between the material and the tool.

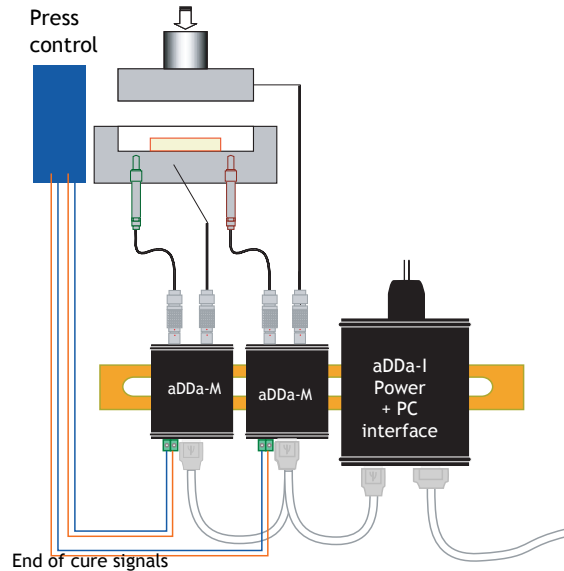


The sensitivity is so good that it is possible to use it without direct contact with the material to be cured.

The sensor is to be placed in the mould at 1 mm from the surface. The tooling precision for the housing is very weak since there is no contact with the material. The sensors do not leave any trace onto the final part, they do not wear and can be unscrewed when the mould is cold.

Application: Dedicated electronic device performs real-time analysis of the signals delivered by the sensors and are capable of end-of-cure detection.

When this happens, the press will receive an electrical signal in order to stop the cure cycle automatically. The system will therefore adapt itself to the reactivity variability of the instant part processed.



Typical results: It is well known that manual processes exhibits more variability than automated ones. Manual processes present often variability in +/-20% in reactive cure times, leading to possible over 10% in global productivity.

Possible extensions: The system is self-working, however a computer connection allows data-logging of signals and settings procedure. It makes trials traceability and production drifts analysis possible. Statistical Process Control (SPC) software module improves efficiently data handling and can be used as automatic precise data feeder for everyday production monitoring.

We provides an end-of-cure electrical signal in order to ensure a maximal profitability **with the warranty of a reproducible cure state.**

Innovative engineering helps to:

- Design of piloting and control tools better fitted to material and processes properties (in general without direct contact).
- Ensure product quality while optimizing production cycles.
- Reduce variable costs in order to improve profitability.