

## Reliable technical heating

# SafeHeat - Tec

SafeHeat - Tec is IEE's self-limiting heating system using Positive Temperature Coefficient (PTC) resistance ink.

### Heating made safer

SafeHeat - Tec is based on IEE's more than 20-year experience with thin foil technology for various sensor applications. Due to the fact that PTC technology increases resistance at higher temperatures, it is considered failsafe with regards to overheating. Moreover this thin surface heating technology is exempt from "hot spots" and extremely reliable.

### Less is more

As the system's PTC technology makes an electronic control unit (ECU) or thermostat unnecessary, the costs and integration effort of offering this feature are reduced.

### Positive Temperature Coefficient (PTC) resistance technology

The PTC-heating elements consist of electrically conductive carbon pigments, which are printed on a flexible film via screen printing process. That technology enables us to adapt the heater design for various applications, including complex 3D shapes.

A typical characteristic of PTC inks is that they change their specific electrical resistance with an increase in temperature and are therefore self-limiting to avoid overheating.



## Key Advantages

- **Robust technology:** SafeHeat's PTC technology means that local damage does not lead to either hot spots or the malfunction of the entire heater. It is also not impacted by water or humidity.
- **Customer-specific:** IEE can develop and produce customized heating foils to meet specific customer requirements.
- **Thin and flexible:** As IEE materials cover a wide range of thickness variation and high flexibility, SafeHeat - Tec can be designed for a variety of shapes, including 3D and curved applications. The heater can also be attached to most surfaces.
- **Energy-saving:** IEE's SafeHeat - Tec offers an overall reduction in power consumption.
- **Experience:** IEE has significant experience in the integration of sensor systems, with our products in serial production around the world.
- **Compatible:** IEE's SafeHeat - Tec can be combined with IEE's sensing technology.
- **Easy integration:** Because IEE's SafeHeat - Tec sensors are flat, they can be easily integrated into panel structures.
- **Failsafe technology:** Due to the fact that PTC technology increases resistance at higher temperatures, it is considered failsafe in terms of overheating.

# SafeHeat - Tec applications

## Batteries

SafeHeat - Tec can also be used as a battery heater for electrical vehicles, or for any other application where it is important that freezing does not occur (e.g. pipelines, barrels, solar panels).

As low temperatures lead to a high voltage drop, IEE's foil heater maintains the battery temperature above a certain level.

As IEE's PTC ink is self-limiting, the heater does not require any ECU or thermostat to ensure a constant temperature.

## Vehicle tanks

The self-limiting PTC panel heater keeps your tank at the perfect temperature, without using electronics and thermostats, which in turn means cost benefits.

Tank heating systems are designed to heat tanks containing fluids and other heat-sensitive materials and can be installed inside the tanks without any modifications required.

## Exterior mirrors

With SafeHeat - Tec, exterior mirrors can also be heated.

## Lens heater

Target: Defogging (De-icing) Lens heaters are protected from steaming up. Provide additional safety.



## About Us

IEE is an innovative developer of specialized sensing systems. Our sensing systems are dedicated to the following markets: Automotive, Building Management & Security, Sports & Healthcare.

IEE was founded in 1989 and is headquartered in Luxembourg. We operate in Europe, the U.S. and Asia, and employ 1,900 people worldwide. More than 10% of our workforce is dedicated to Research and Development.

For more information, please visit [www.iee.lu](http://www.iee.lu).