Description of the PTC heating element

PTC heating elements are composed of PTC thermistors and aluminum housing that are joined by soldering, gluing or crimping. A PTC thermistor is a semiconductor that changes its properties depending on temperature. The internal resistance increases with increasing temperature after a defined temperature is reached (reference temperature). The high Positive Temperature Coefficient (PTC) has given the PTC thermistor its name.

Typical features of PTC heaters:

- Uniform heating without power variation
- Control of the thermal power through the airflow
- Long life
- Self-regulating function
- Fast warm-up

Basics PTC technology

The PTC thermistor is also known as PTC resistor, a treated Polycrystalline ceramic based on barium titanate (BaTiO3). Specific treatment procedures provide that one can obtain high conductivity in the material at relatively low temperatures. In the low temperature area the PTC thermistor acts as a classical semiconductor with a Negative Temperature Coefficient (NTC). When one exceeds the defined reference temperature, resistance increases rapidly with factor 10 (Logarithmic).

The ceramics cannot reach flammable high temperatures because the resistance increases with increasing temperature under the PTC curve and in this way self-limited the power and energy that can pass through.

These characteristics are ideal for heating applications. PTC thermistors are often due to their performance referred to as “Self-regulating” or “Dynamic” heating elements.
Designing heaters based on the PTC technology requires special experience to be able to exchange the heat effectively to the environment. To take advantage of all the PTC heating benefits to its full extent optimized heat dissipation and the knowledge of best lifetime achievement. At IHP, we help our clients to design the PTC element having the best heat output with long life.

Designs

**PTC Contact heaters**
- Secure dynamic self-regulating PTC heaters
- Temperature range 40°C - 220°C
- Voltage 12 - 24V, 100 - 230V AC/DC
- Long life
- Large number of types and shapes available
- Cable connection
- UL, CSA and VDE approved PTC heating elements

**PTC Embedded contact heaters**
- Safe dynamic self-regulating PTC elements
- Temperature range 40°C - 220°C
- Voltage 12 - 24V, 100 - 240V AC/DC
- Long life
- Large number of types and shapes available
- Cable connection
- UL, CSA and VDE approved PTC heaters

**PTC Heating plates**
- Secure dynamic self-regulating PTC heaters
- Temperature range 40°C - 300°C
- Voltage 115 - 230V AC/DC
- Efficient and reliable
- Easy installation
- Flat pin connection
- UL, CSA and VDE approved PTC heating elements

**PTC Cartridge heaters in aluminium**
- Compact self-regulating PTC heating elements
- Ratings up to 200W
- Round aluminium housing for optimum heat transfer
- PAR - Designed with an aluminium cylinder
- PAS - Designed with a sealed aluminium casing
- Easy installation
PTC Cartridge heaters in silicone
- Compact self-regulating PTC heaters
- Ratings up to 100W
- Optimal heat transfer
- Round diameter ø6 - 30mm
- Completely sealed IP68
- Easy installation

PTC Heating block in aluminium
- Compact self-regulating PTC heating elements
- Ratings up to 200W
- Aluminium housing for optimum heat transfer
- Rectangular units
- Easy installation

PTC Air heaters
- Safe dynamic self-regulating PTC heaters
- Ratings up to 4kW
- Voltage 12 - 24V, 100 - 240V AC/DC
- Long life
- Very high power relative to size
- UL, CSA and VDE approved PTC heating elements

PTC Convection heaters
- Secure dynamic self-regulating PTC heating elements
- Rating 10W - 300W
- Voltage 12 - 24V, 110 - 240V AC/DC
- Long life
- Easy installation
- UL, CSA and VDE approved PTC heaters

PTC Embedded fan heaters
- Axial or radial fan
- Compact units with integrated PTC heating elements
- Ready to connect
- Easy to integrate
- Available with thermostat
- Rating up to 1500W
- Voltage 115/230V AC
- UL, CSA and VDE approved PTC fan heaters

PTC Special solutions
- Constructive solutions for individual requirements
- Heat fluids, gases or solid parts
- Solutions provided by IHP