



## PTC Heaters

Positive Temperature Coefficient (PTC) heating elements are small ceramic stones with self-limiting temperature characteristics. PTC stones have fast heating response times and plateau once the pre-defined reference temperature is reached. Above the reference temperature, the semiconducting and ferro-electrical properties of the ceramic are utilized to produce a rise in resistance of several orders of magnitude, and thereby creating its self-limiting properties.

The rise in resistance is experienced within a fairly small temperature window of a few degrees centigrade. This attribute of the PTC results in a heating element that self-regulates to a pre-set temperature and automatically varies its wattage in order to maintain that pre-set temperature. In a given application, a greater degree of thermal dissipation (cooling) will result in a lower resistance being maintained by the element. This effect increases the power output of the heater, during operation in colder temperatures. Inversely as ambient temperature increases and less heat is dissipated, the resistance of the element will increase culminating in a near zero heat output at its designated temperature.

The dynamic resistance and output of PTC heaters makes them an excellent choice for providing controlled electrical heat. In many applications it is possible to do away entirely with thermostatic controls. Simplification of design and reduced energy consumption represent significant cost savings for a given application. The removal of failure prone components such as thermostats can also add significantly to the reliability of a product. Safety is an added benefit, since no matter how much current is applied to the PTC, it will never surpass its intended surface temperature.

PTC stones are doped polycrystalline ceramics based on barium titanate. The Stone is formed after a process that involves blending, milling, drying and sintering. To facilitate electrical connection, metalized contacts known as electrodes are applied to the surface of the PTC.

### \*PTC Features & Benefits\*

- \* Temperature limiting characteristics ensure safety
- \* Dynamic, self-regulating and energy efficient
- \* PTC surface temperatures usually set to around 240C
- \* Temperature tolerances +/- 5° C
- \* Compact design
- \* High power density
- \* Long lifetime
- \* Reliable

