Through the evolution of OKi's product lines there have been some inconsistencies of the Smartheat story. These newer, different, and sometimes made up versions can be confusing and cause us to look less credible when customers hear two stories during the same presentation.
It is the intention of this guide to help us all find a more consistent message to better educate our customers and provide a better Smartheat experience..

How Smartheat Technology Works:
Smartheat heaters consist of two basic elements; a high frequency alternating current (AC) power supply and a heating element. The biggest difference between a conventional soldering system which consists of a ceramic heating element, separate sensor and temperature control circuitry, and a Metcal heater is that the Metcal heating element itself is capable of seeking and then maintaining a predetermined temperature range.
The Metcal heater depends upon the electrical and metallurgical characteristics of two different metals; copper is a material with high electrical conductivity and the other is a magnetic material with high resistance.
When the Metcal heating element is energized by the high frequency alternating current (AC) power source, the current will automatically begin to flow thru the conductive copper core of the heater. However, as the AC current continues to flow, a very useful physical phenomenon occurs, the current flow is directed to the skin of the heater assembly. This is of course known as the "Skin Effect", it drives the majority of the current thru the high resistance magnetic layer, causing rapid heating.
As the outer layer reaches a certain temperature (which is controlled by its patented formula) it looses its magnetic properties. As most of you know this "certain temperature" is the Curie point. The Curie point temperature is when the "skin effect" begins to decrease again permitting the current back into the conductive core of the heater starting the whole cycle over again.
The selection of a material with a fixed Currie point results in a heater that will produce and maintain a specific, self-regulated temperature; and a heater that requires no calibration and responds directly to thermal loads.

That's great, is there a simpler way to explain this to my customers?
Just imagine that you are on the ice fishing trip of a lifetime. It is a perfect January day in the northern reaches of Minnesota, the air is a crisp 35 below and the fish are biting. After a long day on the ice, you retire to your fishing shack with its inviting pot belly stove. You snuggle into your bunk for what should be a long night's sleep, but to your surprise, every 15 minutes you wake up with either a sweaty back or a frozen face. That's right; half of your body is cooking on the stove side while the other half is freezing against the cold wall. You look across the cabin at your fishing buddy and he is sound asleep, seemingly immune to the hot / cold cycles on your side of the cabin. So after staring at him for another hour, you notice his sleeping bag is changing colors from light to dark. You can't help yourself and you wake him up.
"How can you be so comfortable in this cabin?, you scream. He rubs the sleep from his eyes and explains. "I work for a textile company and I'm testing out a new sleeping bag material." You push him for more details, "how does it work?" Well he says, "It senses my body temperature and automatically adjusts its heat and cold absorption to keep my body comfortable." "But what about the hot stove, you ask? And the changing colors? " The material is designed to maintain my body temperature, so it absorbs the heat from the stove and circulates it around my body, when it senses a cold spot from the wall it directs more heat energy to maintain my comfort level, once it reaches body temperature it turns white and stops absorbing and waits for a temperature change, goes dark and then it starts the whole cycle again.

This analogy is close to how Smartheat works. The “material” is made of a metal alloy which has the ability to absorb energy from an electric field and turn it into heat. When the alloy reaches a certain temperature, it stops absorbing energy, and using the fishing analogy, it turns white and its temperature stops rising. When a solder joint draws heat from the heater, the alloy reacts immediately by becoming “dark” again to take on more energy and reheat.

Smartheat Technology:

- No overshoot
- No Calibration
- High throughput at lower temperatures

But what about calibration?

The term calibration implies that because of various components, periodic adjustment must be made to a system to maintain correct operation. Calibration schedules are based on anticipating when these components will go out of tolerance and beating that timeframe and catching it before it can be detrimental to your process. Smartheat’s calibration schedule is in effect, longer than the useful life of the system. There is nothing to adjust, so the system cannot be changed from its initial state. As a result, NO CALIBRATION IS REQUIRED. Smartheat cartridges control temperature by the physical properties of their materials.