Orton®

"Validating Thermal Processing For More Than 100 Years"

TempCHEK:

For Consistent Quality

www.ortonceramic.com

TempCHEKs for a Variety of Ceramic Materials

Ceramic Materials go through important changes as they are heated in a kiln, changes that are necessary to develop specific properties. To produce a quality product, control over the heating cycle is known to be a critical variable in developing key product attributes. **Control of temperature alone is not an effective method for producing a quality product.** Ceramic materials are affected by both the ***temperature*** and the length of ***time*** they are exposed to temperature. Properly monitoring both the time and temperature are essential for maintaining control. TempChek measure the amount of energy input into the firing process, commonly referred to as heatwork, the combined effect of time and temperature. TempChek are made from ceramic materials similar to those associated with producing ceramic products. Therefore, the TempChek react to heatwork in the same manner as the ware. A key reaction that ceramic materials undergo when heated is densification as observed by shrinkage. Orton has developed the TempChek to undergo a high degree of shrinkage so it can be used to measure the heatwork within your process by precise measurement of its shrinkage. The shrinkage measurement, when converted to a heatwork temperature, can represent the success or failure to reach a desired fired property.

Orton produces 5 versions of TempChek covering the following temperature ranges:

TempChek products:

Extra Temp TempChek	1400°C - 1750°C (2550°F- 3180°F)	Part Number **P9035 XTS**
Super Temp TempChek	1250°C - 1500°C (2280°F -2700°F)	Part Number **P9034 STS**
High Temp TempChek	1075°C - 1420°C (2000°F - 2575°F)	Part number **P9033 HTS**
Medium Temp TempChek	950°C - 1050°C (1740°F - 1925°F)	Part number **P9032 MTS**
Low Temp TempChek	800°C - 1100°C (1475°F- 2000°F)	Part Number **P9031 LTS**

Why use TempChek and when are they used?

- For Process improvement
- For monitoring process control
- For Preventative maintenance

The actual temperature inside a kiln when measured by a thermocouple does not give a true representation of the amount of heat absorbed by the product within the kiln. A thermocouple can only report the temperature at a fixed location, usually in the roof or along the sidewall of a kiln. TempChek can be placed anywhere within the kiln to determine the amount of heatwork at that location. The TempChek report the amount of energy absorbed over time within the ware setting by radiation, convection, and conduction. The heatwork measurements can be used to monitor and **improve the uniformity and repeatability of the process.**

Thermocouples and electronic equipment used to control kilns are effective tools, but are subject to errors. Thermocouples can degrade over their useful life and can break without warning. Electronic controllers need to be calibrated and can drift off calibrated settings over time, all the while reflecting a false temperature reading. Since TempChek are not subject to degradation, they can be relied on to report actual changes in the process. Through daily use, they can be used to spot trends and react to them before the product is adversely affected.

Can they be used for Statistical process Control?

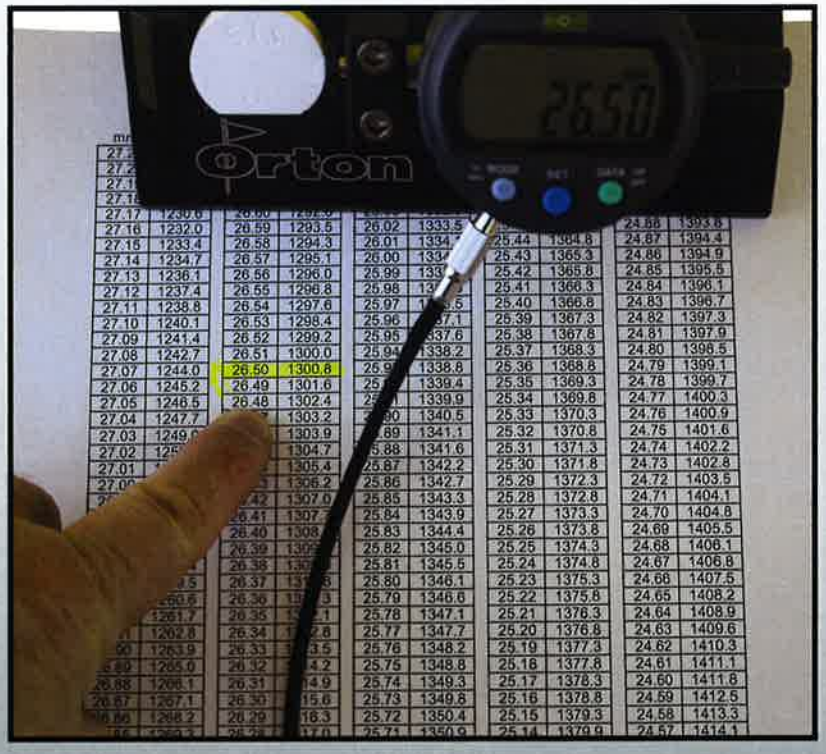
Yes, using the Orton TempTracker software, up to nine locations can be monitored within a kiln to ascertain the uniformity of the kiln and the repeatability of the process. Adjustments to gas burners or power outputs, dampers, ware setting patterns, and air flows can be noted on the control chart generated by the software and the reflected changes can be monitored. Further fine tuning can be conducted until a steady state is achieved. Orton provides the TempTracker software free to all of its customers.

How are they measured?

Gather the TempChek after completion of the firing cycle, measure the fired diameter using the Orton Desktop gauge. Each TempChek can be labeled beforehand using a high temp marker or inscribing some identification into them with a scribe or the tip of a nail. It is best practice to place the TempChek in as close to the same location every time. Enter the measurement into the TempTracker software and monitor the results.

How is the shrinkage transferred to temperature?

Orton conducts several firings in a tightly controlled kiln to generate data for the shrinkage conversion tables they provide with each batch of TempChek. Orton engineers use a set heating profile when conducting calibration firings. The profile uses a final heating rate of 60°C/hr followed by a one hour hold at peak temperature. Additional data is available for adjusting the heatwork temperature for hold times greater or less than the standard one hour hold time. The TempChek temperature is a representation of the amount of heatwork absorbed. The temperature associated to the shrinkage value does not represent actual temperature. For customers wanting to maintain even tighter control, Orton can work with you to develop firing data specific to your thermal profile, produce and set aside a specific batch of TempChek to last for an extended period of time, or set up blanket releases of product to spread out cost. **



*** Subject to credit approval and minimum quantities, additional fees may be required for services.*

Product features and benefits

- Provides independent process temperature verification
- Able to easily monitor temperatures in the load
- High sensitivity to process changes
- Temperatures reported do not drift over time
- Cost effective
- Easy to use
- Shelf stable
- Free software
- Product identification on each part
- Highly accurate gauge available for use with software
- Technical support from Orton

For more information and to discuss your specific applications for TempCHEKs contact Orton.

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