

# Profile

FOR MORE THAN A CENTURY—

## Orton Ceramic Offers Pyrometric Monitoring Devices, Analytical Instruments, Testing

Orton Ceramic, provider of independent thermal, mechanical and physical property testing of ceramic materials, got its beginning more than a century ago when Edward J. Orton Jr. established the Standard Pyrometric Cone Company in 1896.

Orton was a pioneer in developing and applying scientific principles to ceramic manufacturing. In 1894, he was appointed the first chairman of the ceramic engineering department at The Ohio State University, the first ceramic engineering school in the United States.

Orton recognized the ceramic industry's need to have a calibrated visual device to measure the amount of heat work delivered to ceramic products during the firing process to insure the products were mature. To meet this need, he developed a series of pyrometric cones (ceramic cones that sag consistently in response to time and temperature conditions) and established the Standard Pyrometric Cone Company to manufacture the cones. Even with the subsequent development of thermocouples and

electronic temperature controllers, Orton's pyrometric products continue to be a part of process control systems around the world.

At his death in 1932, Orton provided in his will for creation of the Orton Foundation to operate as a charitable trust to continue the operation of the Standard Pyrometric Cone Company for the benefit of the ceramic community. The Foundation funds research projects from submitted proposals.

The Foundation has three distinct areas of products and services:

1. *Pyrometric monitoring devices for thermal processing*
2. *Analytical instruments*
3. *Testing services*

The oldest Orton product is the pyrometric cone. Used in kilns and furnaces worldwide, Orton Pyrometric Cones assure users that their firing process is under control. Cones measure heat work, the effect of time and temperature. Cones give visual assurance that the firing process is consistent from one processing cycle to the next.

For the investment casting industry, Orton manufacturers TempTabs which are a Pyrometric shrinkage device that provides relative temperature data based on shrinkage. TempTabs can be placed throughout the furnace to measure relative temperature uniformity or can be used on a regular basis as input into SPC (statistical process control) charts. TempTabs are helpful when used as an early warning device to spot trends before they impact your product. Once a TempTab goes through the thermal process, it is measured with a digital micrometer. The measurement is looked up in a table—supplied with each batch—to find the relative temperature achieved in the process. TempTabs will survive rapid firing cycles and have been prefired so that no outgassing occurs.

Orton designs, produces and sells a range of testing equipment for the ceramics and glass industry, for use in production monitoring and quality control operations. These include dilatometers for measurement of dimensional changes with temperature cycling, gradient furnaces, systems for measurement of glass properties (softening point, annealing and strain point, liquidus temperature, viscosity, coefficient of thermal expansion). Often these systems are customized for a particular user's requirements, and can include such options as higher-than-normal furnace temperatures, and accommodation for particular sample types or sizes.

The testing laboratory serves clients around the world, with samples arriving by common carrier from users and manufacturers. Mechanical testing at ambient and elevated temperatures and thermal property testing are available. For investment casting operations, testing of shell molds can provide information key to improving conforming results and reducing finishing costs. Many of the tests regularly performed are ASTM standard procedures, addressing temperature stability and strength at use temperatures. Available testing includes:

- *Thermal expansion*
- *Thermal conductivity*
- *Thermal shock*
- *Flexural creep*
- *Hot compressive strength*
- *Hot bending strength*
- *Permeability*
- *Reheat changes*
- *Modulus of rupture*
- *Young's modulus*
- *Density*
- *Porosity*

Orton routinely tests an exhaustive range of samples, including the full range of refractory brick products as well as castable mixes, mortars and shell molds.

Additional services include chemical and mineralogical analyses and machining of advanced ceramics. Specific projects and consulting contracts are undertaken at client request.

For additional information, call The Orton Foundation at 614-895-2663, e-mail [info@ortonceramic.com](mailto:info@ortonceramic.com), or visit [www.ortonceramic.com](http://www.ortonceramic.com).

