

# Phoenix Heat Treating Tempered the Green Dragon



**Pete's new Dragon delivers high volume, high quality heat-treating with repeatable performance.**

Peter Hushek, president and CEO of Phoenix Heat Treating, just added a new continuous cast-link belt furnace he calls, "The Green Dragon." It's not the same as other furnaces by any means. This dragon understands the language of thermo chemistry as it breathes fire and spits out a continuous stream of heat-treated carbon steel parts.

Because of the addition of a new state-of-the-art logic controller and electronic atmospheric gas flow meters, the furnace provides complete details of each heat-treating process. The automated control system regulates the furnace's operation via a PC interface and reports detailed documentation on exactly what the furnace is doing – fan rotation, pressures, belt speed, carbon set point,

**The new automated furnace meets strict performance and quality certifications of the automotive and aerospace industries.**

temperatures, etc., in real time. The information can be accessed by a laptop anywhere in the world 24-7. Every heat-treating cycle is archived and the recipe can be called-up, and tweaked if necessary, to repeat the exact process the next time a customer delivers a new batch of parts.

"Peter wanted the ability to provide as much automation as possible for his customers and to be able to control his

**An operator can log into the system and see a simulation of everything the furnace is doing in real-time.**

furnace from his desk or laptop," said Steve Thompson, President of Super Systems, Inc. maker of Peter's integrated software system and control instrumentation for heat-treat furnaces. "He now has one of the most intelligent, fully automated, continuous furnaces in the country," he said.

With the addition of Super System's leading-edge automated technology, and electronic gas flow meters made by Atmosphere Engineering, Peter can log-into the Green Dragon's control system from his home, at a customer's office, or while traveling, to see exactly what customer's parts are running at the time; and to learn what condition the parts are in. A computer screen snap-shot shows what the furnace is doing so he can check on the atmosphere in each zone of the furnace, or even print out a documented report to review with a customer, as the furnace is heat-treating the parts.

"We purchased and re-engineered a conventional heat-treat furnace to make the invisible heat-treating process visible," Peter says. "The automation tells us precisely what the furnace is doing at all times. We archive the data

and can call up the recipe six days or six months from now, and the furnace will heat-treat those parts exactly

as it did before. There is no more missing information, or black box thinking," Peter says.

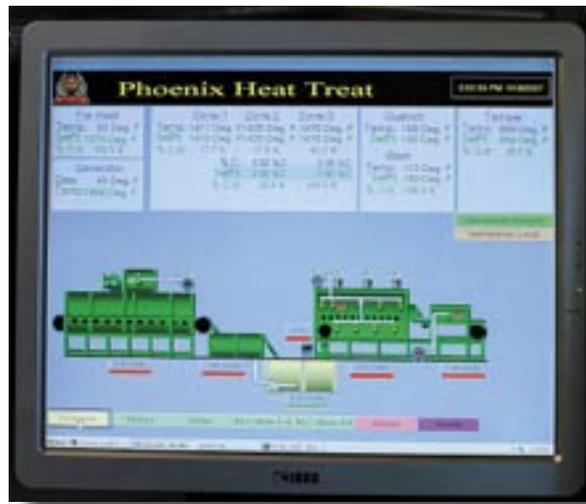
The new technology ensures that Phoenix Heat Treating customers will receive individualized calibrated heat-treat-

ing, and Peter's company can provide traceability and detailed review of every customer's load-cycle. "The flow meters cost more than the entire furnace," says Peter, "but the investment was necessary to perform flow rate certifications or to input calibrations without shutting down the furnace to do so," he said.

The Green Dragon now facilitates much quicker parts turn-around and more cost effective heat-treating than the furnace was capable of doing even in its first life. Peter says the typical turn-around time is two or three days instead of two or three weeks. The new Green Dragon is the largest continuous furnace in a 350-mile radius of Phoenix.

Peter explained that the addition of the continuous furnace has now positioned Phoenix Heat Treating as a high-quality, lower-cost thermo-processing company that can handle a larger variety of high-volume commercial parts. This includes a number of commercial industry segments, but new work from fastener, metal stamping and screw-machine companies, is already being processed.

In its rebirth, the Green Dragon was converted into a custom, one-of-a-kind cast-link furnace. Two years in the making, it began as a relic furnace purchased from a firm in Toronto, Canada. The hulk was transported to Phoenix in late 2004 in three semi-trailer loads, and over the course of two years, it was completely



**The system looks at the quality of the gas flow in real-time and communicates with the flow meters to keep the atmosphere where it should be.**

rebuilt and re-fabricated with new components and digital processors, including the computerized control system and very accurate Atmosphere Engineering electronic flow meters.

Phoenix Heat Treat hired one of the former OEM engineers who built the furnace to help with the transformation into a super-automated, intelligent beast. The endeavor advanced technology to a new level and makes Phoenix Heat Treating one of only a hand-full of companies in the nation called upon by experts for input on the development of future heat-treating equipment.

The decision to convert to automation wasn't cheap, however. The upgrade and retrofitting of the old furnace, as well as expanding the plant to house the continuous-furnace, was a \$1.25 million investment for the company. But the investment is paying off because the furnace has been in continuous operation since it was fired-up in November of last year.

Smaller heat-treat furnaces, called "batch furnaces" which are prevalent in the industry, and even many manually operated continuous-belt furnaces, are very labor-intensive to operate without intelligent automated systems. Although Phoenix Heat Treat's batch furnaces are automated, Peter

says that with batch heat-treating, a part could require up to eighteen worker interventions over the course of heat-treat-

ing carbon steels. The Green Dragon reduces the preparation and set-up process to no more than four touches, and in most cases, requires only a couple of handlings from when the parts arrive for heat-treating.



Phoenix Heat Treating is a well-known entity in the Valley. Started in 1963 by Peter's father, Chuck Hushek with two partners, Bud Charles Fisher and Hank Zeppin, the company has grown from a small garage-size rented space to a 40,000 square-foot facility today. It was known in the 60's, and still is, as "the heat-treating company that can handle very difficult and risky heat-treating jobs. Peter started working in the plant during high school, initially sweeping floors and assisting other employees. He left Phoenix to attend the University of Arizona to become a metallurgical engineer, but after two years he felt he had learned enough to return to the business. With his new-found knowledge, he worked as the second-shift foreman for the company.

**The continuous furnace can save customers up to 60% when running at volume.**

After two years, Peter knew that there was more to learn about molecules in metals when they are heated to blazing temperatures of 2500-degrees, so he returned to the University of Arizona to complete his metallurgical engineering degree. Today, he still remains in contact with his alma mater to provide apprenticeship opportunities to future engineers and often volunteers his time in teaching roles and Arizona State University and the East Valley Institute of Technology in Arizona.

When Peter returned to work, his father asked him if "he wanted a job, or if he wanted to learn the business from the ground up." (Chuck had bought-out his partners several years earlier). Peter chose the later and began working under the tutelage of his father. At the sudden passing of his father in 1988, Peter assumed management of the company and was gratified that he had chosen to finish his engineering degree and learn every aspect of the heat-treating business.

"He died a happy man," Peter explained. "He had a stroke on the evening of his 25th anniversary celebration

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at the plant. He was thrilled that the business was doing well and three of his four sons were working with him." Today, Peter and his brother Mike are the only active family participants, as the other brothers have embarked upon other endeavors.

Peter said that the Green Dragon will be used to process high-volume commercial business, and that it will also relieve about ten-percent of the plant's current batch furnace volume. The company operates a number of batch furnaces, suitable for low-volume heat-treating,

and superior for complex parts, including:

- 1 @ 2000 lbs/hour furnace
- 2 @ 1500 lbs/hour furnaces
- 1 @ 800 lbs/hour furnace
- 2 @ 400 lbs/hour furnaces

These six furnaces can process approximately 2200-2500 pounds of carbon steel per hour. With the addition of the Green Dragon with a 2500 pound capacity, the company can now process about 5000 pounds every hour, a 40-percent increase for the company, Peter said. "That number may actually be low, we're still pushing the Green Dragon to do more, and it appears that it can efficiently handle more than 3000 pounds an hour."

In addition to heat-treating carbon steels of all kinds, the company also does vacuum and aluminum heat-treating. Services include core harden, austenitize, austemper, electro-polish, carburize, carbonitride, garnet blast, age, quench, temper, anneal, copper plate, aluminum, titanium, straighten, among other processes.

**The company's experience through years of aerospace heat-treating are being used to fine-tune commercial production; and experience acquired on the new commercial side is being applied to speed-up production on aerospace production, Peter explained.**

For more information on Phoenix Heat Treating, call Peter Hushek at 602-258-7751. You can also review their services at [www.phxheatreat.com](http://www.phxheatreat.com).



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