



Case Study

Core Bake and Preheat Oven Offers Thermal Consistency and Improves Production Capacity

Since 1948 Eck Industries of Manitowoc, Wisconsin, has supplied premium aluminum castings to customers in the military, hybrid vehicles, commercial trucking, aerospace, medical, industrial, and energy markets. It is a privately-held, family-owned business that in its 68 years in business has grown from operating in a garage of 7,200 square-feet to a sprawling complex of 210,000 square-feet.

Eck Industries manufactures a wide variety of castings such as airfoils, engine blocks, water and air-cooled cylinder heads used in engines that power engines of all kinds, from high performance marine to aerospace and aircraft engine components. Many of these engine components involve thin wall and finned casting features. The ability to produce intricately cored components of these difficult castings requires extreme control over core making, baking and heating operations.

A variety of core making processes are used including SO₂, PUNB and shell molding techniques to produce small- to medium-sized parts that require high dimensional precision. In the case of some complex components, in addition to individual intricate cores, assemblies and sub-assemblies of cores are produced to make very complex castings.

When Customer demand for complex cored castings increased significantly, Eck Industries needed a new core oven to more than double the existing core oven capacity, and would need an oven that offered better temperature control, with faster more uniform heating of cores.

"A few years ago, we started looking for a new oven," said John Herrenbruck, Eck Industries' VP of Technical Services. "It was decided that a dual-lane oven would suit our purposes best and we sought bids from two oven manufacturers, eventually deciding on a unit from Wisconsin Oven Corporation."

According to Doug Christiansen, Application Engineer at Wisconsin Oven, "This oven was designed for dual use per Eck's request. They can also use this two-lane indexing conveyor oven as a batch oven for aluminum aging aerospace parts. The system was guaranteed to a thermal tolerance of $\pm 10^{\circ}$ F but actually proved out at $\pm 5^{\circ}$ at 550° F."

The new oven features a 500,000 BTUH burner system and 30,600 CFM of recirculation air. The unit is designed with top-down airflow through the work chamber to deliver air over the full width and length of the heating chamber. The ductwork is adjustable so it can be set for optimum air flow efficiencies.

Additionally, the furnace utilizes PLC/HMI controls used for indexing conveyance, door actuation, alarms and alarm management, index timing of each lane and I/O status. Variable index rates are available to allow variable heating time, and each lane can operate independently of the other, improving the flexibility of the unit to customer production needs. At Eck Industries, a typical core can now be heated from 150F to over 475F in less time than previously possible.

In early 2014, Eck Industries installed its new core oven from Wisconsin Oven and fired it up. Core can presently be processed on each conveyor and oven capacity is no longer a problem. As core comes out of the oven (generally on alternating tracks), an operator uses a hoist to offload the hot core.

According to John Herrenbruck, "The oven basically ran great 'right out of the box' and has been running extremely smoothly about 20 hours/day ever since. To me, the best part is the faster heat-up and temperature uniformity of core we are now getting."