

High Temperature Elevator Retort Furnace



Spark the future.™

High Temperature Retort Furnace: Advanced Features

- Fiber insulation for fast turn-around and reduced energy consumption
- Water cooled seals to ensure atmosphere integrity
- PLC controlled sequencing for easy operation
- Data recording and historical archiving for each cycle
- Alert system for any deviation from process parameters
- Self diagnostic feature assists operators
- Ethernet communications to local intranet for monitoring process
- Hygrometer to monitor, control, and record dew point
- Oxygen analyzer to monitor, record, and interface with the furnace control system

Inert Gas Atmosphere. Excellent Repeatability.

Harper International again demonstrates its extensive legacy in innovative technology solutions with this unique heat processing system for the application of heat resistant coatings.

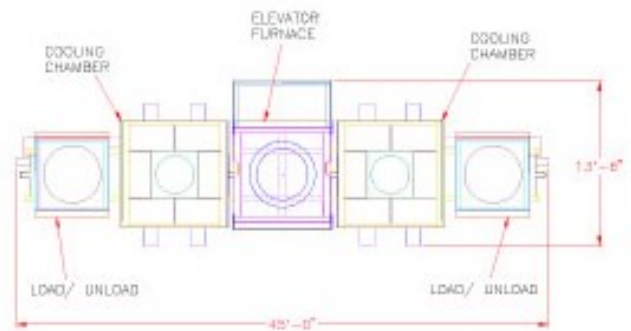
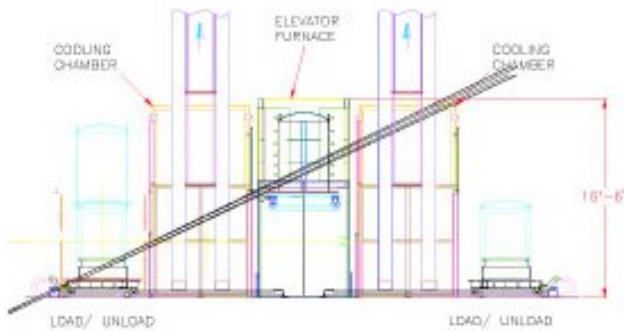
An inert gas retort furnace design was utilized due to the many advantages over a vacuum furnace system. The objectives of high quality reliability, improved process flow, reduced maintenance cost, and productivity enhancement were all achieved with this modern system conceived by the Harper team.

The Harper elevator kiln includes significant design enhancements over previous elevator systems. These include variable mass flow controlled gas flow into the retort, oxygen and water vapor sensing systems, additional heating elements and control zones for exacting temperature uniformity ($\pm 5^{\circ}\text{C}$), and isolated cooling chambers.



Turbine Blade Coating System

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The Harper system includes two kiln cars with independent cooling chambers. The first car is moved automatically into the furnace, removed hot, and transferred into the cooling chamber. The second car is then loaded, increasing furnace utilization and greatly improving the process flow throughout the entire coating operation.

Isolating the cooling process has made a dramatic improvement to the work environment and reduced the air conditioning load. A PLC provides automatic control for all process sequencing, monitors process variables, reacts to deviations, and provides safety features.

Specifications

Max Temperature	1120°C (2050°F)
Heating Rate	444°C/hr (800°F/hr)
Cooling Rate A	80°C/hr (140°F/hr)
Cooling Rate B	260°C/hr (465°F/hr)
Temp Uniformity	± 5°C (± 9°F)
Retort Size	122 cm (48") diameter x 122 cm (48") high
Atmosphere.....	Inert, reducing, oxidizing

About Harper International

Harper International is a global leader in complete thermal processing solutions and technical services essential for the production of advanced materials. Our capabilities in Furnace and Oven technologies are focused on continuous processing at high temperatures and in specialty atmospheres. From concept to commercialization, from research scale to full production line operations, Harper is perpetually on the cutting edge.

For additional information about Harper, please harperintl.com or email us at info@harperintl.com.