



The Industry Leader in Turnkey  
Polycrystalline Wool  
Refractory Systems

Engineer • Manufacture • Install



**ArmorMax**  
Engineered Systems

## The Proven Solution for Reheat Furnace Applications

ENGINEER ■ MANUFACTURE ■ INSTALL

For much of the past decade, the challenge of providing robust, long-lasting refractory linings in reheat furnaces – which now must increasingly withstand the extreme temperature cycling of batch furnaces – has gone unanswered. In recent years, that challenge has been further complicated by demands to cut energy use and reduce greenhouse gas emissions.

Now, thanks to the experts at ArmorMax Engineered Systems, there is a solution that addresses all of these issues. For nearly a decade, and for longer than any other refractories company in North America, ArmorMax has been designing, producing and installing customized polycrystalline wool (PCW) refractory panels and systems with the demonstrated ability to deliver years of maintenance-free service while significantly cutting fuel consumption and related emissions.

In fact, ArmorMax PCW panels have a maximum use limit of 2900° F and are proven to experience shrinkage rates of less than 1 percent at 2600° F, while providing significant return-on-investment through the following benefits:

- Ability to withstand continuous and drastic thermal cycling without failing
- Faster heat-ups and cool-downs
- Reduced fuel consumption and emissions
- Increased furnace production
- Less maintenance
- No dryout requirements
- Expedited furnace turnarounds
- Diminished stress on furnace superstructures

## ArmorMax Engineered Systems Engineer ■ Manufacture ■ Install

ArmorMax Engineered Systems was among the first companies to design and install PCW refractory panel systems and has been on the leading edge of the technology ever since. Today, ArmorMax Engineered Systems, together with its affiliate ArmorMax Industrial Services, is one of the few, if not the only, refractories company in North America to offer steel manufacturers a complete turnkey solution for reheat furnaces using PCW panels. The ArmorMax Engineered Systems process includes:

### Field measurement and on-site diagnostics

ArmorMax performs on-site diagnostics, including thermal imaging of your furnace in operation, to document areas of heat loss and optimize the design of the new refractory lining.

### Custom lining engineering and design

ArmorMax engineers and designs a lining specifically for your reheat furnace, illustrating the placement of PCW panels and other components that will combat previous areas of vulnerability.

### Customized PCW panel production

Once the lining design is approved, ArmorMax manufactures customized panels using PCW exclusively or in combination with conventional refractory ceramic fiber to minimize cost, maximize performance and expedite on-site installation.

### Delivery and on-site installation

ArmorMax builds PCW panels in our facility, and once delivered, ArmorMax Industrial Services installs them according to your approved CAD drawings, which streamlines production and minimizes downtime.

## Proven Results

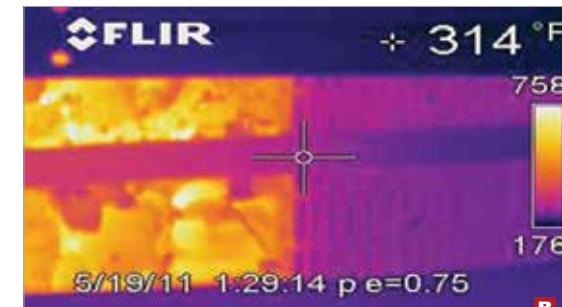
ArmorMax Engineered Systems completes several major PCW panel system installations every year. Many are for repeat customers that have experienced the combined benefits of ArmorMax's experience and expertise in PCW technology and have chosen to apply them to other heat-processing vessels under their management.

The following photos highlight a typical ArmorMax Engineered Systems PCW installation. They clearly demonstrate the superior performance of PCW linings and illustrate why so many reheat furnace operators are now investing in this technology. The installation depicted here continues to function virtually maintenance-free several years after installation:

**A** An 8-by-3-foot ArmorMax PCW panel was used to make an emergency repair to a billet walking beam furnace. The 12-inch-thick PCW lining was retrofitted directly to the existing furnace structure without modification, replacing a 45-percent rammed refractory plastic in the soak zone roof.

**B** A thermogram was taken of the repaired soak zone area while in operation at 2350°F. In this true side-by-side comparison, the existing rammed refractory plastic lining exhibited a cold face temperature of over 700° F compared to the 215° F cold face produced on the ArmorMax PCW panel.

**C** Based on the dramatic differences observed with just one panel, the customer elected to replace the entire roof system during the next scheduled outage.



## ArmorMax Industrial Services

### Value and Single-Source Responsibility for your PCW Project

Using ArmorMax Industrial Services for all PCW panel installations enables ArmorMax Engineered Systems to maximize the value of your investment in two ways:

The first is the peace-of-mind that comes from having one company manage and assume responsibility for all aspects of your project. The second is eliminating the costly mark-ups that many refractories companies add by using third-party contractors. Value. Performance. Accountability. You get it all from ArmorMax.

## Contact Us

To learn more about how ArmorMax Engineered Systems PCW panel solutions can provide a major return on your refractories investment, contact us at:

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