



PRECAST REFRACTORIES

Allied Mineral Products, Inc.



ALLIED'S PRECAST CENTER



Allied's precast center, was founded in 1995, in Columbus, Ohio when it acquired American Precast Refractories. Since then, the precast center has become a leading supplier in the manufacture of precast, prefired refractory shapes in a variety of industries.

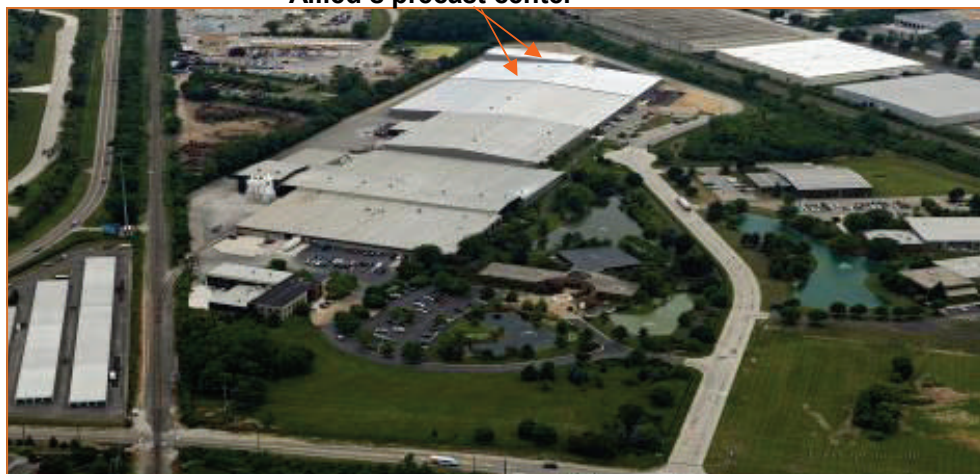
In 2009, Allied's precast center expanded into a production facility where it has access to over 1,000 refractory product formulations for specialized customer needs. With more than 50 years of combined experience in refractory shapes we pride ourselves in delivering quality products to our customers all over the world.

- **Solution driven** - Collaboration between sales, research, engineering and manufacturing
- Superior **quality** assurance
- **Extensive product** offerings including the ultimate ceramic-metal composite for shapes, METAL-ROK®
- Shapes manufactured from Allied's **flagship product lines**
- **Depth of knowledge** provided by collaboration between these plants, along with our worldwide sales and manufacturing capabilities
- Shapes from **2 lbs. to 10 tons** (1 kg to 15 metric tons)
- Engineering capabilities at **all facilities**

Our application engineering capabilities enable us to design and manufacture complex shapes of almost any shape and size. Shapes can be designed and produced from existing drawings or from an existing shape.

Designs include foundry crucibles, furnace structural parts, EAF deltas and spouts, filters and skimmer blocks, incinerator shapes, and rotary furnace shapes.

Allied's precast center



Allied Mineral Products
Headquarters - Columbus, Ohio, USA

CASTING FACILITY

Allied's casting facility was constructed specifically for the forming, firing and finishing of precast refractory shapes. Being at the forefront in providing quality materials and outstanding technical support is critical.

Our capabilities include:

- 100,000 sq. ft. casting facility constructed specifically for shapes production
- High intensity paddle mixers capable of handling large cast shapes
- Two, 20 ton overhead cranes with full-building bridge travel
- Improved firing abilities and a flexible firing schedule with daily firings
- Atmospheric controlled casting room for specialty applications
- High firing capabilities up to 2300°F



EXPANDING TO NEW MARKETS

Allied's precast division has expanded to meet the growing demands of Allied's customers and their markets.

In 2012 our Tianjin, China precast facility expanded by adding high fire capacity and additional casting process abilities.

August 2014, Allied will open its European precast facility in Tholen, Netherlands. Allied will provide refractory shapes to the foundry, industrial, and steel markets in Europe.

Capabilities include:

- One stop monolithic and precast shape purchases from one location
- Locally sourced materials for lower cost estimates
- Over 50 years of precast shape experience
- Dedicated research and engineering teams that provide trouble-shooting services



Tianjin, China



Tholen, Netherlands

FOUNDRY INDUSTRY

Allied Mineral Products uses innovative technology to create unique precast shapes that withstand harsh temperature changes in any molten metal transfer applications. Allied has access to expert recommendations and unique technological applications in engineering and design. Access to Allied's vast product lines ensures the right product line for your needs.

Allied offers a complete line of shapes which can be utilized for:

- Coreless Furnaces
- Channel Induction Furnaces
- Cupolas
- Gas-fired Furnaces
- Resistance Rod Furnaces
- Heat Treating & Forging Furnaces
- Reverberatory Furnaces
- Vacuum Induction Tundishes
- Transfer Ladles
- Ductile Treatment Ladles
- Pouring Tundishes / Boxes
- Launderers
- Centrifugal Casting Feed Equipment
- Impact Shapes

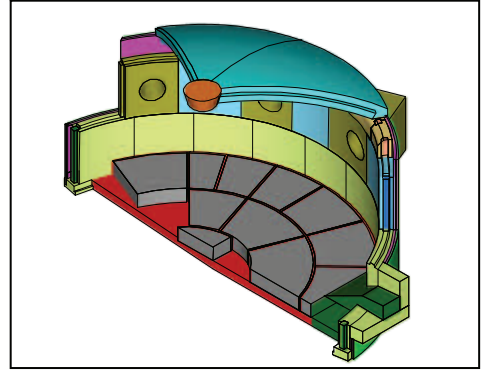


ALUMINUM INDUSTRY

Allied can customize and design any precast shapes utilized in molten aluminum applications because it has access to Allied's extensive product catalog, including products designed specifically for the aluminum industry.

In 2010, Allied Mineral Products, Inc. and Pyrotek joined efforts to better serve the aluminum industry with precast shape solutions. Some of our unique capabilities include:

- Reverberatory Furnaces
- Diecasting Holding Furnaces
- Runners
- Tundishes
- Funnels
- Custom Pouring Components
- Reverb Dome Covers

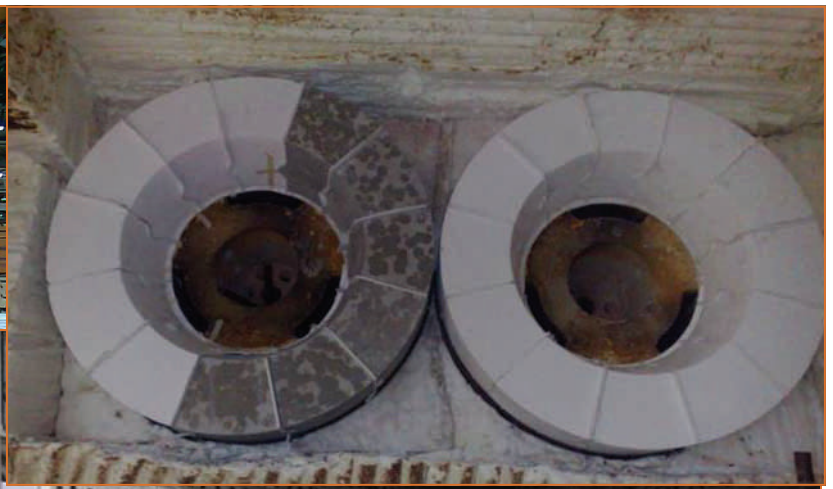


HEAT TREATING AND FORGING INDUSTRY

Allied has access to a complete line of monolithic refractories designed for use in the heat treating and forging industries. The resources available enable Allied to offer customers with customized precast shapes designed for high temperature applications.

Allied offers a complete line of shapes for:

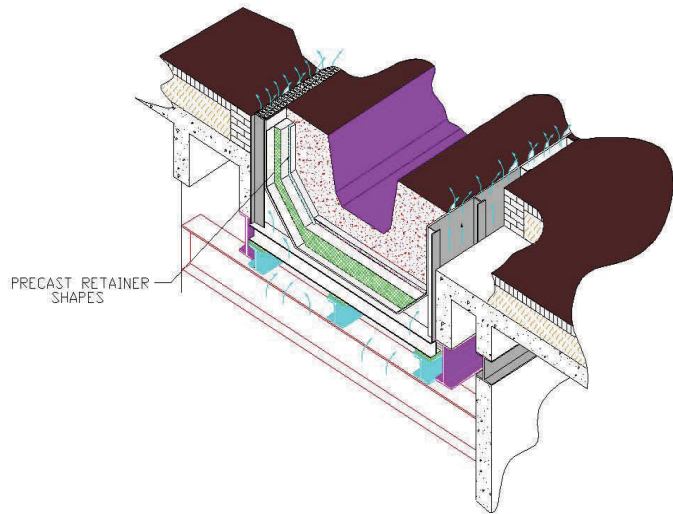
- Car Decks
- Pier Blocks
- Burner Tiles
- Lintels
- Jambs
- Flues



STEEL INDUSTRY

Allied's precast center works closely with the engineering and research departments to enhance furnace productivity through innovations of product design. Allied offers a complete line of specialized precast, pre-fired refractory shapes for the steel industry including:

- Iron Troughs
- Runners
- Slag Runners
- Tilting Runners
- Transfer Equipment
- Blast Furnace Subhearth / Hearth
- EAF Roof Deltas
- EAF Spouts
- EAF Electrode Rings



INDUSTRIAL MARKET

Allied has developed a variety of durable, versatile products including METAL-ROK® ultimate ceramic-metal composite for shapes. Allied's Research team created METAL-ROK as a dependable, durable product for many applications in the industrial market. In addition to METAL-ROK, Allied has an extensive product arsenal to manufacturer shapes specifically suited for the following:

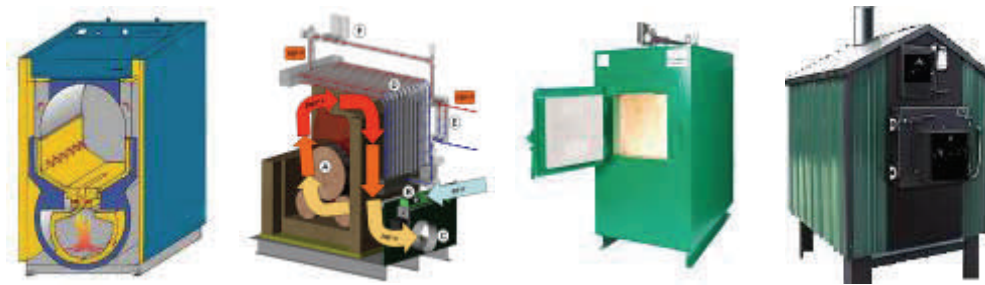
- Asphalt Processes
- Boilers
- Cement
- Hazardous & Bio-incineration
- Iron Ore Processing
- Incineration Processes
- Lime Kilns
- Power Generation
- Waste to Energy Gasification Processes



HEARTH RELATED PRODUCTS

Allied offers precast shapes for the Home and Hearth Industry that are resistant to alkali attack, mechanical abuse, abrasion resistance and high temperatures. Allied's capabilities include unique precast shapes for the following:

- Fireplaces
- Woodstoves
- Pellet Stoves
- Bio-mass Stoves
- Indoor / Outdoor Wood Boilers
- Gasifiers



ALLIED ADVANTAGES

The Allied Difference

Allied is there every step of the way. Our attention to the needs of customers creates the basis for developing customized precast solutions. Allied provides mechanisms to facilitate ease of installation and onsite support. We have proven methods for making a wide variety of shapes in several markets including steel, foundry, mineral processing, power and other specialized, industrial applications.

Innovations in engineering and product design systems allow our customers to improve productivity, increase ease of installation and reduce downtime. The ability to produce shapes from the extensive product lines offered by Allied, paired with collaboration between, Research and Technology, Sales, Engineering and Manufacturing, provides customers the best solutions and the fastest response times.

Advantages of precast division

- Shapes made with Allied Mineral refractory products to meet high quality standards
- Hands on quality evaluation
- Inventory and supply chain management
- Experience serving the precast shapes market
- Eliminate need for customers to cast and cure refractories
- Global Capabilities and manufacturing

Product Advantages

- Reduced Installation Time
- Reduced Heat-up Time
- Labor Savings
- Energy Savings
- Pre-fired and Ready to Install
- Improved Performance
- Product Evaluation Flexibility



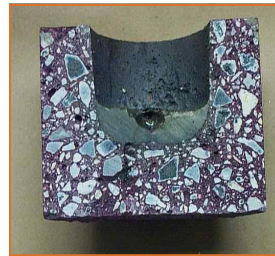
Quality and Manufacturing

Producing quality, consistent products is top priority for **Allied Mineral Products**. Allied's focus on quality at every stage of the production process is unparalleled. Allied's stringent raw material standards and quality control testing before and after each batch is produced, provides customers with consistent products.

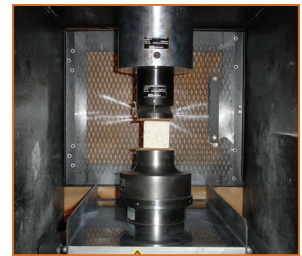
Allied provides quick response times to any urgent product request through flexible manufacturing systems located at all 8 of its global manufacturing facilities.

Quality Control:

- Strict raw materials qualifications
- Batch testing
- Global quality management
- ISO certified since 1985, quality focus since 1961



Contact Tests



Strength Testing



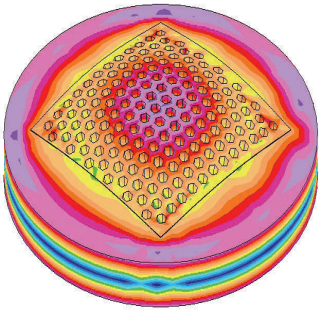
A variety of packaging options, extensive stock and flexible manufacturing to meet urgent orders.

INTEGRATED TECHNOLOGY

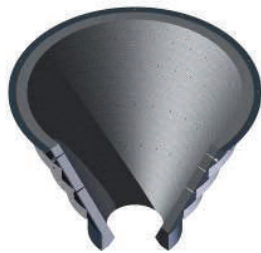
Design Engineering

Allied prides itself on providing every customer with customized precast shapes solutions. Allied starts by gaining a detailed understanding of customer's specific needs. The Allied team evaluates operating criteria and physical design parameters then develops a detailed Engineered Design encompassing:

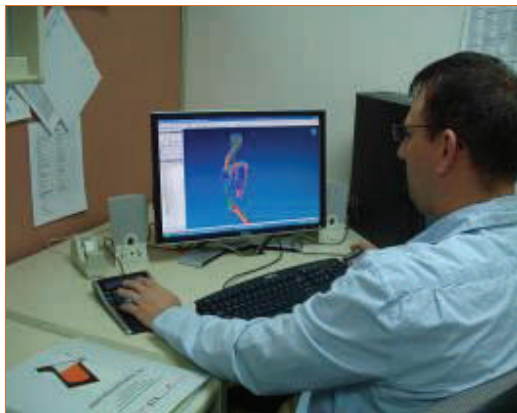
- Shape geometry
- Optimized product construction and fit of shapes systems
- Thermal models to optimize and validate designs
- Proven safety lining system designs incorporating precast shapes
- Unique applications design ability
- Leading edge refractory system designs



FEA Thermal Analysis



Refractory Design Engineering



Design Engineering

Materials Technology

Allied is focused on developing new products, improving existing products and perfecting installation techniques. Product testing and development is conducted in Allied's state of the art research and technology center. An on-site gunning and shotcreting lab allows for extensive hands-on testing of installation properties. Allied is a technology-driven supplier devoted to providing customized refractory solutions for operations including:

- Wide variety of high performance refractory products
- Superior raw material quality
- Tailored product selection to reduce chemical attack
- Unique installation properties - vibration cast, pump cast, gunning and shotcrete
- Modern laboratory for refractory design and testing
- On-site gunning and shotcreting lab



XRF



XRD



Prototype Samples



Flow Testing

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