ABOUT ALLIED

Allied Mineral Products is a world leader in the design and manufacture of monolithic refractories. We are present in over 100 countries, with 12 manufacturing facilities, 3 research & technology facilities, 5 precast shapes facilities and large sales and service teams in the foundry, aluminum, steel, heat treating / forging and industrial markets.

Allied’s success is based on our dedication to Being There Worldwide with Refractory Solutions. Our product lines include innovative refractory technology and longstanding refractory alternatives.

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

ENGINEERING & RESEARCH

Allied starts the product selection process by first gaining a detailed understanding of your specific needs. Our team then evaluates operating criteria and physical design parameters to create a detailed Engineered Design encompassing:

- Optimized product zoning
- Thermal models to optimize and validate designs
- Proven safety lining system designs

We are focused on developing new products, improving existing ones and perfecting installation techniques. Product testing and development is conducted in Allied's state of the art research and technology centers. Allied is an innovative, technology-driven supplier, devoted to providing customized refractory solutions for various industry operations. Our wide variety of high performance refractories use superior raw materials, are vigorously tested in our modern labs, and are tailored to unique installation and application condition requirements.
GRAPHITE & CARBON ANCILLARY PRODUCTS

GC and HC Product Lines | WE CAN FILL THE VOID

Allied offers a comprehensive collection of carbon and graphite based cements, mortars, ramming materials and grouts. These dependable, industry-leading products are designed to fulfill ancillary needs in blast furnaces, cupolas and ferroalloy furnaces.

<table>
<thead>
<tr>
<th>Original Allied Line</th>
<th>Industry-trusted Products</th>
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<tbody>
<tr>
<td>HC3F</td>
<td>C34 Two-component carbonaceous heat setting cement</td>
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<tr>
<td>HC4F</td>
<td>C38 Two-component carbonaceous heat setting cement</td>
</tr>
<tr>
<td>HC5F</td>
<td>C46 Single-component carbonaceous heat setting cement</td>
</tr>
<tr>
<td>HC6F</td>
<td>CP9 Carbonaceous hot ramming paste</td>
</tr>
<tr>
<td>HC8F</td>
<td>EZRAM RP10 Highly thermally conductive graphitic ram</td>
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<tr>
<td></td>
<td>SMART RAM® RP20 Thermally conductive, self-correcting ram with</td>
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<tr>
<td></td>
<td>specially treated graphite flake</td>
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<tr>
<td></td>
<td>GR37 Two-component carbonaceous grout with expanding flake graphite</td>
</tr>
<tr>
<td></td>
<td>EZRAM RP3 Single component carbonaceous ram</td>
</tr>
<tr>
<td></td>
<td>EZRAM RP4 Single-component carbonaceous ram</td>
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</tbody>
</table>

TAPHOLE MATERIALS

Allied is the leader in high-alumina & anhydrous taphole clay sales in North America. We offer a comprehensive line of taphole clays that span from siliceous plugging pastes for the alloy industry to high-alumina clays designed for high production, multiple-taphole blast furnaces.

<table>
<thead>
<tr>
<th>Taphole Materials for Blast Furnaces</th>
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<tbody>
<tr>
<td>RSR 101</td>
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<tr>
<td>RSR 1170 R-AM</td>
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<tr>
<td>RSR 1170R Modified</td>
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<tr>
<td>RSR 963-14</td>
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<tr>
<td>Restoration Clay</td>
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<tr>
<td>RSR Green Tap</td>
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</tbody>
</table>
STACKCRETE®

The STACKCRETE® line features several products with silicon carbide additions, designed to match the unique properties and temperatures of each zone of blast furnace stacks. These products are suitable for maintenance throughout the stack lining and are designed to withstand impact, abrasion, temperature fluctuation, slag attack, CO attack and alkali attack. The STACKCRETE® line also features a wide range of installation methods.

STACKCRETE® G is Allied’s innovative graphitic castable that can be used as both a repair and replacement material for carbonaceous refractory/brick. STACKCRETE® G offers:
- Shortened installation time
- Reduced labor cost
- Reduced lead time compared with brick refractories
- Can install using cast in place, gun or shotcrete technique

ALAKAST

ALAKAST is a line of castable refractories, ranging from no cement to conventional cement, that are ideal for various areas of steel reheat furnaces. Each ALAKAST mix is designed to meet a unique application requirement, such as volume stability, excellent flowability and high strength. These products also feature a variety of installation options.

BLAST KAST™

Our trademarked BLAST KAST™ products are designed for shotcrete installation, making them ideal for wall and roof applications in reheat furnaces. These low cement mixes are noted for their versatility and dependable delivery and performance.

V-CAST®

The V-CAST® line for iron-making is a collection of alumina-based castables with additions of silicon carbide and carbon. These products are recommended for use in a variety of applications, including blast furnace and cupola troughs, slag and iron runners, tilting runners, spouts, and tap holes. There is a V-CAST® product tailored to each application’s unique operating temperature and conditions.

FLOORING: TUFFLOOR

TUFFLOOR is designed for areas exposed to extreme thermal cycling and intermittent exposure to liquid metal spills, dross and slag. It is a versatile product that can be installed as a complete floor, over existing (or new) concrete, or as precast tiles.

TUFFLOOR has years of success in repairs and rebuilds of casthouse floors, and has also proven successful in a wide variety of coke oven blast furnace and other integrated steel equipment areas.
SKAMOL

**INSULATION BOARD**

Allied carries SKAMOL’s line of vermiculite based insulation boards that help save energy and reduce costs.

- SKAMOL VIP-12 HS BOARD
- SKAMOL VIP-12 HS CLICKBOARD

SKAMOL insulation board products help steel ladles preserve heat and maintain internal temperature. These products reduce lining thickness, increasing ladle capacity. SKAMOL VIP-12 HS CLICKBOARD features an innovative perforated design that allows simple and fast installation.

**INSULATING FIREBRICK**

SKAMOL’s collection of insulating firebrick, supplied by Allied, is the ideal choice for back-up insulation systems for hot blast stoves. These systems can be customized for high insulation properties or high strength.

- HIPOR 450
- POROS
- SUPRA

Benefits of SKAMOL insulating firebricks include low thermal expansion, reduced heat loss, high cold-crushing strength and resistance to alkali and acid attack.

**OTHER SUPPORTING PRODUCTS**

Allied carries the ancillary products you need to complete your process.

- Carbon firebrick
- Installation equipment
- Thermocouples and wire
Allied Mineral Technical Service, Inc. (AMTS) offers value added technical assistance in the critical areas of the blast furnace, hot blast stove and cupola. The AMTS team has decades of experience in the industry and is backed by Allied Mineral Products, a global leader in refractory technology and production.

**AMTS Supports:**
- Blast Furnaces
- Hot Blast Stoves
- Hot Blast Systems
- Casthouse Design
- Cupolas

**Engineering and Design Services**
Our value added technical assistance includes a range of data collection and analysis and engineering design capabilities to help optimize furnace operation.
- Hearth monitoring and modeling
- Failure diagnostics of hearth and taphole
- Innovative refractory selection
- New and spent refractory testing
- Advanced cooling systems
- STACKCRETE® high conductivity grout

**Field Services**
Our team is on site providing supervision and assistance to ensure your operations run safely and efficiently. Our support includes:
- Assistance for:
  - Core drilling
  - Grouting
  - Installation
  - Maintenance
- Emergency responsiveness
- Data collection equipment placement
- Refractory properties and behavior monitoring
- Analysis of melt practices
- Training on refractory best practices

Allied Mineral Technical Services
AMTS@alliedmin.com | alliedmineraltechnicalservices.com
CASTHOUSE

TROUGH / RUNNER

WORKING LINING
- V-CAST® 218A
- V-CAST® FA2L
- V-CAST® 418A
- V-CAST® 712A
- V-CAST® 719A
- V-CAST® 739A
- RAPID PUMP 2750 SC

SAFETY LINING
- DRI-VIBE® 660A
- RAM 491A
- CW 7929 Castable (Precast retainer shape)

MAINTENANCE
- TEK-GUN 408A
- DRI-VIBE® 348A
- DRI-VIBE® 512A

INSULATION
- Super Firetemp X

IRON TILTER

WORKING LINING
- V-CAST® 133A
- V-CAST® 712A
- V-CAST® 720A

SAFETY LINING
- MATRIPUMP 60

LADLE

WORKING LINING
- TUFFCRETE® 62M-FR

SAFETY LINING
- MATRIPUMP 60
REHEAT - PUSHER FURNACE

EXTRACTOR SHAPES
ALAKAST 98 EZC
ALAKAST 90 LC-P
ULTRACON 34C

HEART
ALAKAST 98 EZC
ALAKAST 90 LC-P
TUFFCRETE® 90
ALAKAST 85 LC-P-ES

SUBHEART
ALAKAST 45-P
ALAKAST 50 LC-P
TUFF-FLO 50
Super Firetemp X

BUMPER & SKID BLOCKS
ALAKAST 98 EZC
(Pre-cast shape)
ALAKAST 90 LC-P
TUFFCRETE® 90
ULTRACON 34C
ALPHAMAX T

BURNT WALLS & ROOF
BLAST KAST 70 LC

SIDE WALLS
BLAST KAST 70 LC
TUFF-FLO 50
BLAST KAST 45 LC

WET SKID SYSTEM
ALAKAST 68 LC-P
ALAFLOW 60 LC-P
TUFF-FLO 65M
REHEAT - WALKING BEAM FURNACE

SIDE WALLS
- BLAST KAST 70 LC
- TUFF-FLO 50
- BLAST KAST 45 LC

BURNER WALLS & ROOF
- BLAST KAST 70 LC

HEAT ZONE SLOT & DEFLECTOR BLOCKS
- ALAKAST 45 LC (Precast shape)
- TUFF-FLO 50 (Precast shape)
- ALAFLOW 60 LC-P (Precast shape)
- TUFF-FLO 65M (Precast shape)

WET SKID SYSTEM
- ALAKAST 68 LC-P
- ALAFLOW 60 LC-P (Precast shape)
- TUFF-FLO 65M
## REHEAT - ROTARY HEARTH

### ROOF
- BLAST KAST 70 LC

### SIDE WALLS
- BLAST KAST 70 LC
- TUFF-FLO 50
- BLAST KAST 45 LC

### CURBS
- ALAKAST 68 LC-P
- ALAKAST 50 LC-P
- TUFF-FLO 65M

### SKID BLOCKS
- ALAKAST 98 EZC
  (Precast shape)
- ALPAHMAX T
- ULTRACON 34C

### HEARTH
- ALAKAST 90 LC-P
- ALAKAST 68 LC-P
- TUFF-FLO 60A
- ALAKAST 50 LC-P
- DURACON 32

### SUBHEARTH
- ALAKAST 45-P
- ALAKAST 50 LC-P
- TUFF-FLO 50

### BURNER BLOCKS
- LCF 798A
- BRICKMIX 81
- KAST TECH 60
- MATRIPHOS 85AC
- QUICK-FIRE® 88

### INSULATION
- Super Firetemp X
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