



REFRACTORIES

— FOR —

HEAT TREATING & FORGING



Global **Refractory** Solutions



ABOUT ALLIED

Allied Mineral Products is a world leader in the design and manufacture of monolithic refractories and precast shapes. With strong sales and service teams in the foundry, aluminum, steel, heat treat/forge and industrial markets, our success is based on our dedication to *Being There Worldwide with Refractory Solutions*.

Producing quality, consistent products is top priority at Allied and we have the products to meet your refractory needs. Our extensive product line includes innovative refractory technology and longstanding refractory alternatives.

Allied's focus on quality at every stage in the production process is unparalleled. A stringent raw material standard and global quality control testing before and after each batch is produced, provides customers with consistent products. We provide quick response times to any urgent request through flexible manufacturing systems at all our manufacturing facilities.

Global **Refractory** Solutions



12 MANUFACTURING FACILITIES
OVER **160** INTERNATIONAL SALES REPRESENTATIVES
3 RESEARCH AND TECHNOLOGY FACILITIES
SALES ACTIVITY IN MORE THAN **100** COUNTRIES
7 PRECAST SHAPES FACILITIES





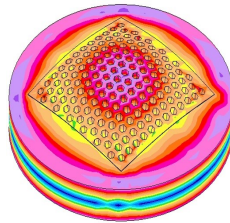
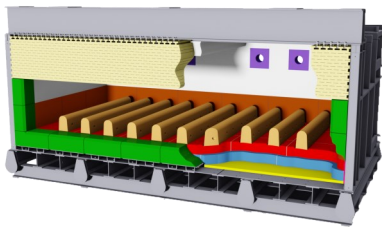
RESEARCH & ENGINEERING

After gaining a detailed understanding of your specific needs, our team evaluates operating criteria and physical design parameters to create a detailed engineered design encompassing:

- Patented technologies
- Optimized product zoning
- Thermal models to optimize and validate designs
- Proven safety lining system designs
- Unique installation properties and techniques
- Leading edge refractory system designs

We're focused on developing new products, improving existing products and perfecting installation techniques. Our product development and testing is conducted in our state of the art research and technology center. We have an on-site gunning and shotcreting lab allowing extensive testing of installation properties.

As an innovative, technology-driven supplier we're devoted to providing customized refractory solutions for various industry operations. We offer a wide variety of high performance refractory products with superior raw material quality.



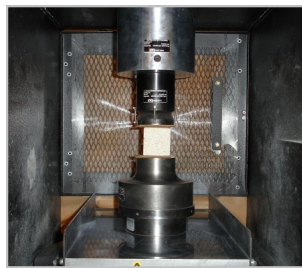
FEA Thermal Analysis



Flow Testing



Contact Tests



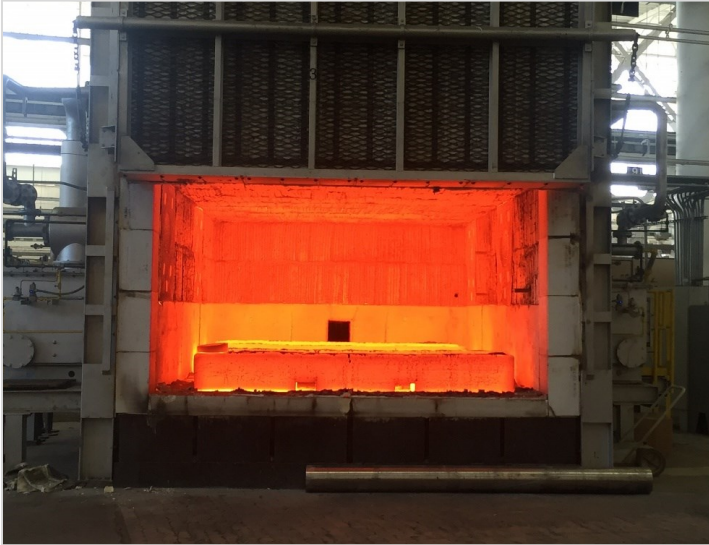
Strength Tests





PRODUCT INNOVATION

ARMORMAX®



ARMORMAX® 70SR is a 70% alumina low-cement castable which is part of a family of high needle containing refractories.

ARMORMAX® is ideal for heat treating and forging applications where thermal shock can shorten refractory life.

It's high needle content provides resistance to mechanical impact and abrasion. ARMORMAX® has high fracture toughness allowing it to remain in service long after conventional refractories start to fail.

Product line benefits

- High thermal shock resistance
- Withstands severe impact and abrasion conditions
- High strength retention after repeated thermal cycling



ARMORMAX® sill after 1 month in service



ARMORMAX® sill after 18 months in service



ARMORMAX® sill after 52 months in service

in our
element

process
global
BOX FURNACE

refractory
research

JAMBS

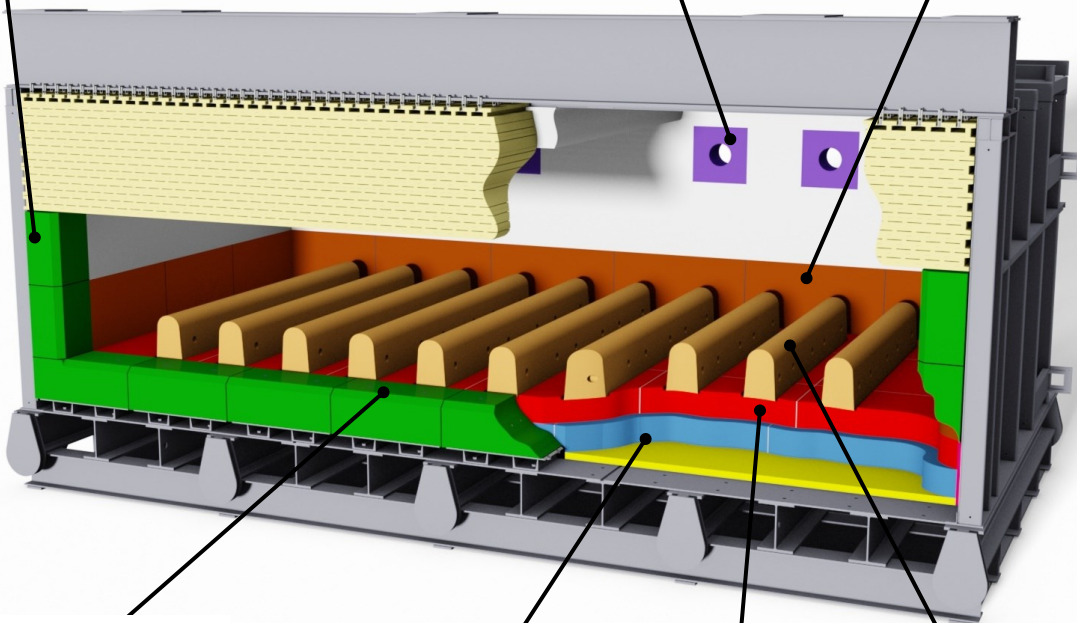
- ALAKAST® 50 LC-P+SS
- ALAKAST® 50 TSR+SS
- ARMORMAX® 70 SR
- RAM MAX® 45 AS
- TUFF-FLO 60A

BURNERS

- BLAST KAST 70 LC
- BRICKMIX 81
- KAST TECH 60
- LCF 798A
- MATRIPHOS 85AC

CURB WALLS

- ALAKAST® 68 LC-P
- BLAST KAST® 70 LC
- RAM MAX® 45 AS
- TUFF-FLO 50



SILL

- ALAKAST® 98 EZC
- ARMORMAX® 70 SR
- RAM MAX® 45 AS
- TUFF-FLO 50

SUBHEARTH

- ALAKAST® 45-P
- BETAMAX® 24 LT
- PUMPLITE 60
- TUFFCRETE® 47

HEARTH

- ALAKAST® 68 LC-P
- ARMORMAX® 70 SR
- DURACON® 32
- TUFF-FLO 50
- TUFF-FLO 60A

PIER BLOCKS

- ALAKAST® 50 TSR
- ALAKAST® 98 EZC
- ARMORMAX® 70 SR
- TUFF-FLO FSM

ΔT
thermal expansion
+
= %
?





CAR BOTTOM FURNACE



PERIMETER

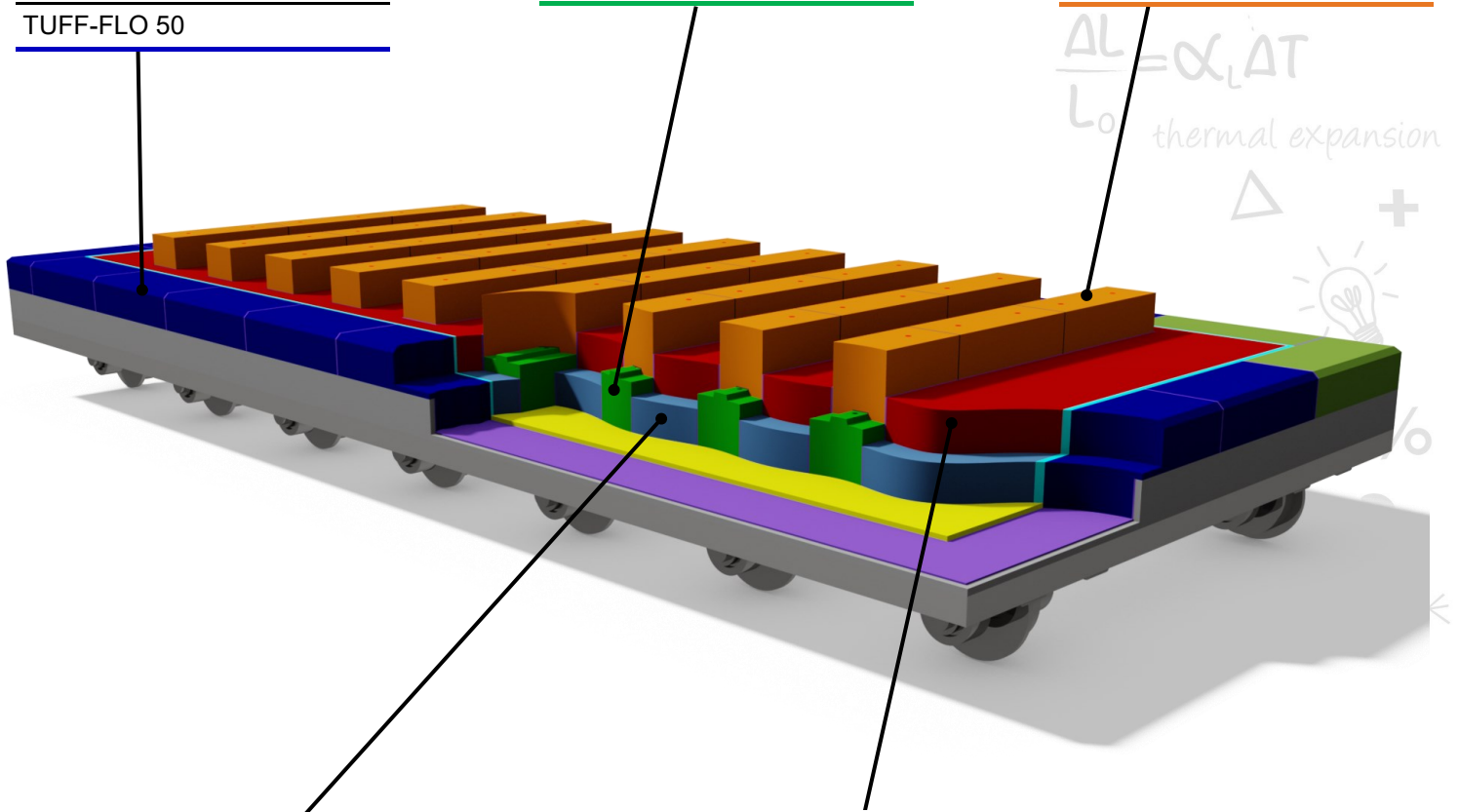
- CAST 2550 LI C
- DURACON® 32
- TUFF-FLO 50

SUB-PIER BLOCKS

- DURACON® 28
- TUFF-FLO 50

PIER BLOCKS

- ALAKAST® 98 EZC
- ARMORMAX® 70SR
- TUFF-FLO FSM



$$\frac{\Delta L}{L_0} = \alpha_L \Delta T$$

thermal expansion

SUBHEARTH

- BETAMAX® 24 AC
- DRI-LITE® 79 AL-M
- PUMPLITE® 60

HEARTH

- ALAKAST® 65 LC-P
- DRI-VIBE® 434A
- DURACON® 32
- TUFF-FLO 50
- TUFF-FLO 60A





TIP-UP & ROTARY HEARTH FURNACE

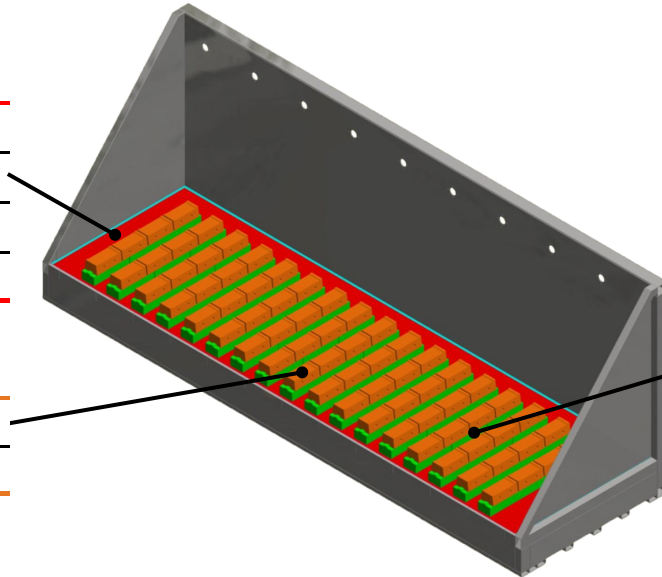
TIP-UP FURNACE

HEARTH

- _____ DRI-VIBE® 434A
- _____ DURACON® 32
- _____ TUFF-FLO 50
- _____ TUFF-FLO 60A

PIER BLOCKS

- _____ ARMORMAX® 70SR
- _____ TUFF-FLO FSM



SUBHEARTH

- _____ BETAMAX® 24 AC
- _____ DRI-LITE® 79 AL-M
- _____ INSULMIX® 2460 LI
- _____ PUMPLITE 60
- _____ PUMPLITE 80

ROTARY HEARTH

ROOF

- _____ BLAST KAST® 70 LC

SIDE WALLS

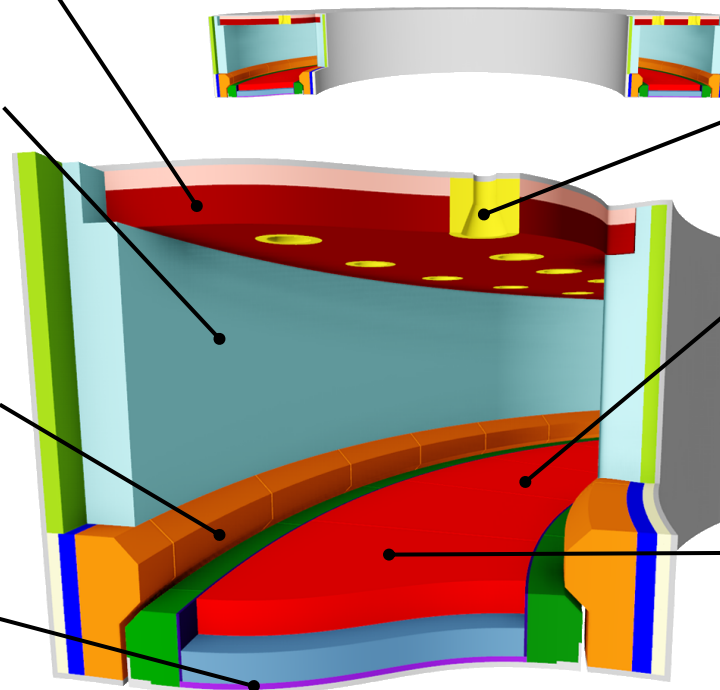
- _____ BLAST KAST® 45 LC
- _____ BLAST KAST® 70 LC
- _____ TUFF-FLO 50

CURBS

- _____ ALAKAST® 50 LC-P
- _____ ALAKAST® 68 LC-P
- _____ TUFF-FLO 50

SUBHEARTH

- _____ ALAKAST® 45-P
- _____ ALAKAST® 50 LC-P
- _____ TUFF-FLO 50



BURNER BLOCKS

- _____ LCF 798A
- _____ BRICKMIX 81
- _____ KAST TECH 60
- _____ MATRIPHOS 85 AC

SKID BLOCKS

- _____ ALAKAST® 98 EZC
- _____ ALPHAMAX T
- _____ ULTRACON 34C

HEARTH

- _____ ALAKAST® 50 LC-P
- _____ ALAKAST® 68 LC-P
- _____ ALAKAST® 90 LC-P
- _____ DURACON® 32
- _____ TUFF-FLO 60A



INDUCTION HEATING & PRECAST SHAPES

INDUCTION HEATING



PRODUCTS

COIL CAST FS /
COIL CAST FS - FAST

CAST 217 FS /
CAST 217 FS FINE

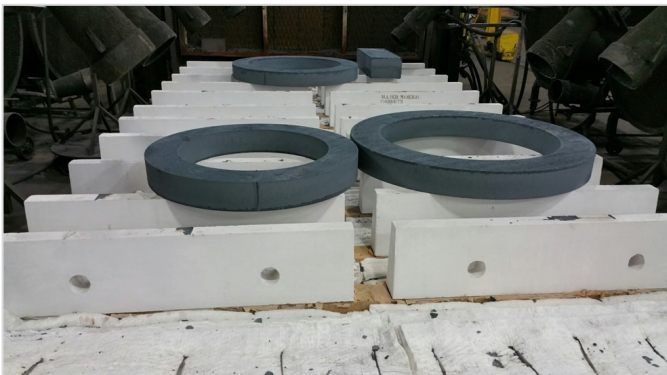
COIL CAST 97A

COIL CAST M

LCF798 FINE

TUFFLOOR

PRECAST SHAPES



HEARTHES

ALAKAST® 50 LC-P

ALAKAST® 68 LC-P

ARMORMAX® 70 SR

DURACON® 32

TUFFCRETE® FS

CAR PERIMETERS

ALAKAST® 50 TSR

TUFF-FLO 50

TUFF-FLO 60A

JAMBS / LINTELS

ALAKAST® 50 LC-P

ARMORMAX® 70SR

DURACON® 32

LCF798A

BURNERS

ALAKAST® 85 ULC

KAST TECH 60

LCF798A

MATRICAST 3110C

CURB WALLS

ALAKAST® 68 LC-P

BLAST KAST® 70 LC

DURACON® 32

TUFFCRETE® 47

TUFF-FLO 50

PIER BLOCKS

ALAKAST® 65 LC-P

ARMORMAX® 70 SR

DURACON® 32

TUFF-FLO FSM



FLOORING

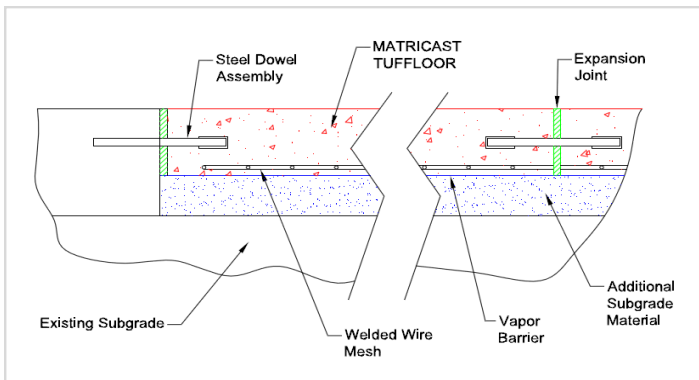
refractory

TUFFLOOR® is designed for areas exposed to extreme thermal cycling and intermittent exposure to scale, 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 over 20 years of proven performance in forging and heat treating plants, primary metal production facilities (aluminum, steel, iron, zinc, copper, ferro-alloys), rolling mills and many other hot flooring applications.

Benefits include:

- Fast project turn around time due to its early strength development
- Exceeds the cold crushing strength of conventional concrete
- Reduced maintenance time and expense
- Safer working surfaces
- Minimizes wear on mobile equipment
- Custom colors available
- Excellent freeze-thaw properties



Engineering Design for a High-Load Application

A variety of colors

TUFFLOOR **Standard Concrete**
Thermal Cycling to 1400°F (760°C)





process
global
refractory
research

MAINTENANCE

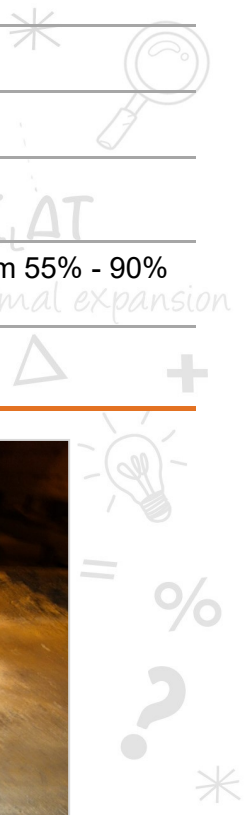
ALAGUN	General purpose gunite castable for a wide range of applications. Ranging from 10% to 70% alumina.
BLAST KAST®	Shotcrete refractory mixes ranging from 45% to 70% alumina
DRI-VIBE®	Dry vibratable, heat-set refractories for restoring hearth hot face
MATRIGUN	Gunite refractories ranging from super duty to 70% alumina
MATRIPHOS	Phosphate-bonded plastics for repairing most types of refractory surfaces
QUICK-FIRE®	Two component phosphate bonded castables & gun mixes. Product ranges from 55% - 90% alumina.
TUFFCRETE®	Shotcrete refractories ranging from 50% to 70% alumina



QUICK-FIRE® 65 perimeter repair



Lower jamb and curb wall repair with TUFFCRETE® 70X shotcrete





SUPPORTING PRODUCTS

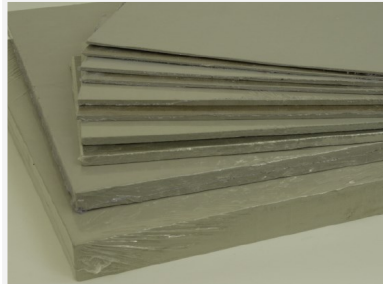
Ceramic Fiber Insulation

- 2300°F, 2600°F and 3000°F blanket
- Board
- Modules
- Paper
- Bulk
- Soluble (non RCF) Fiber
- Hardware
- Ropes
- Textiles
- Vacuum formed shapes



Insulating Board

- Microporous board
- Super Firetemp Cal-Sil
- Durablock
- Fireboard HS & LD
- *Thermal Ceramics* Insulating Board
- Cal-Sil Board
- Vermiculite Board
- Mineral Wool Board
- Marinite Board
- Transite Board
- CS-85 Cal-Sil Board



Stainless & Ceramic Anchors

- 60%, 70% and 85% alumina anchor tile
- Stainless steel and alloy anchors
- C-clips



Firebrick

- Medium duty firebrick
- High heat duty firebrick
- Super duty firebrick
- 70%, 85%, 90% alumina brick
- Insulating Firebrick
- SiC and nitride bonded brick
- Square edge tile
- High alumina anchor brick



Insulating Firebrick

- 1600°F-3250°F
- AMP series IFB
- BNZ IFB
- Moler

Skamol Products

Moler Insulating Brick

- M-Extra
- Supra
- Hipor 450
- Poros



Calcium Silicate Board

- S-1100E
- Super-Isol

Vermiculite Board

- V-1100
- VIP-12 HS
- Clickboard





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