

REFRACTORIES

— FOR —

ALUMINUM



Global **Refractory** Solutions



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 145 INTERNATIONAL SALES REPRESENTATIVES
3 RESEARCH AND TECHNOLOGY FACILITIES
SALES ACTIVITY IN MORE THAN 100 COUNTRIES
5 PRECAST SHAPES FACILITIES





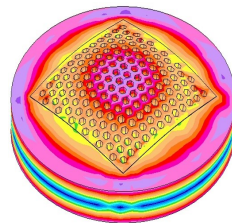
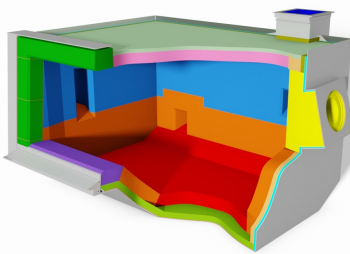
RESEARCH & ENGINEERING

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.



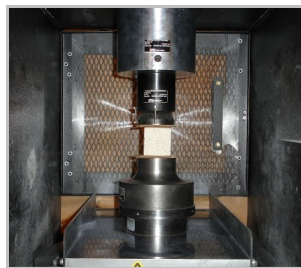
FEA Thermal Analysis



Flow Testing



Contact Tests



Strength Tests





PRODUCT INNOVATIONS

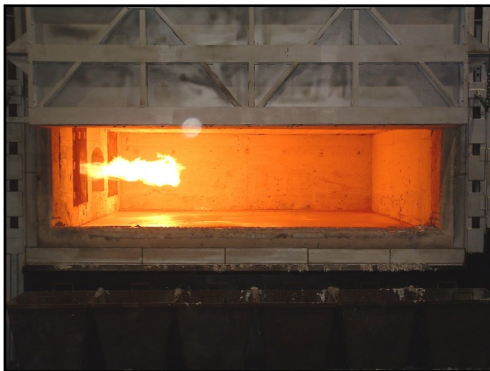
QUICK-FIRE®

Product line benefits

- Rapid dry-out characteristics
- Designed to bond to existing refractory
- Fast setting properties
- Excellent non-wetting characteristics
- Superior thermal shock resistance
- Available in gunning formulations
- Global availability



MATRIFLO



Allied's MATRIFLO product line is high alumina, low cement castables that are specifically designed for aggressive aluminum alloys

- Provides superior corrosion resistance
- High strength
- Excellent non-wetting properties
- Resistant to salt flux

	MATRIFLO AL C	MATRIFLO 85 ACX
Al ₂ O ₃	85.3 %	85.6 %
CaO	2.1 %	2.3 %
SiO ₂	8.4 %	8.5 %
Density	2.82 g/cm ³ (176 lb/ft ³)	2.74 g/cm ³ (171 lb/ft ³)
Grain size	25 mm (1 inch)	8 mm (5/16 inch)



process

REVERBERATORY

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research



ROOF

MATRIPUMP AR 61

MATRIPUMP 50

MATRICAST 3110C

UPPER SIDE WALLS

MATRIPUMP AR 61

MATRIPHOS 70AC

QUICK-FIRE® 88

BURNERS

KAST TECH 60

QUICK-FIRE® 88

MATRIPHOS 85AC

JAMBS / LINTELS

QUICK-FIRE® 88

QUICK CAST® 62

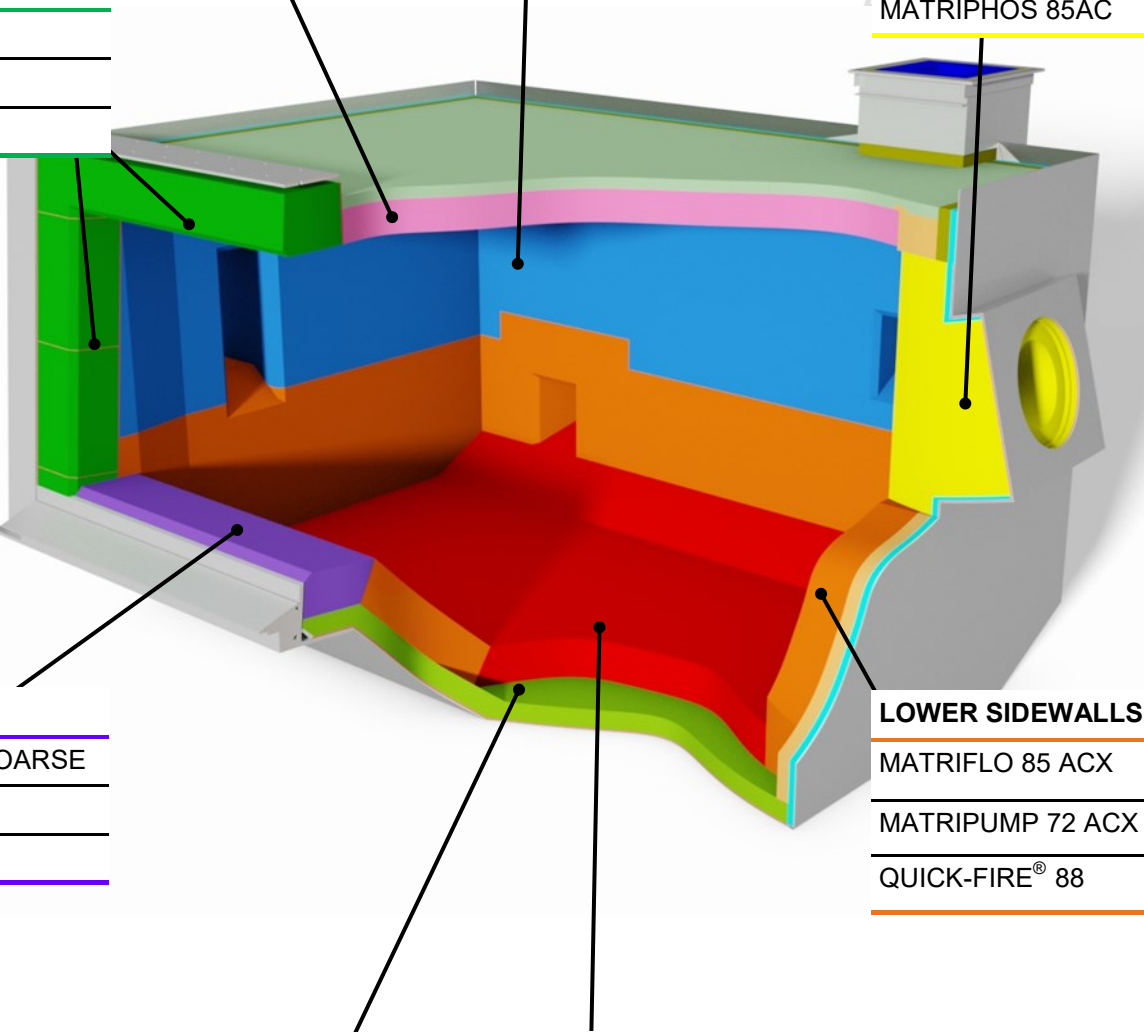
ARMORMAX® 70SR

RAMP / SILL

MATRIFLO 70 ACX COARSE

MATRIFLO AL C

ARMORMAX® 70 AC



LOWER SIDEWALLS

MATRIFLO 85 ACX

MATRIPUMP 72 ACX

QUICK-FIRE® 88

SUBHEARTH

MATRICAST 2600 AC

MATRIPUMP 51 ACX

HEARTH

MATRIPUMP 63 ACX

MATRIPUMP 70 ACX

MATRIFLO 85 ACX



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STACKMELTER

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

thermal expansion

STACK

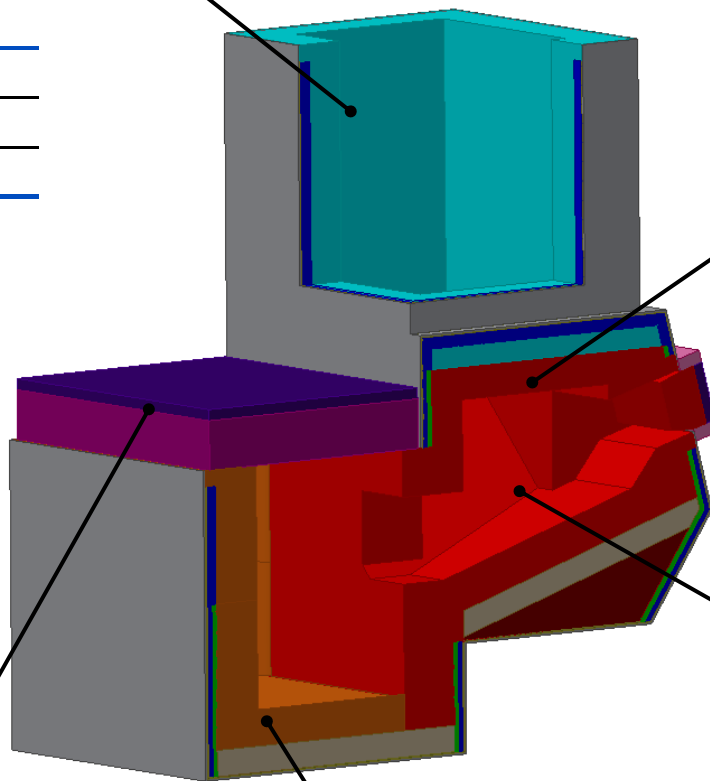
- ARMORMAX 70 SR
- MATRIFLO 85 ACX
- QUICK CAST® 61 ACX

BURNERS

- KAST TECH 60
- LCF 798A
- MATRIPHOS 85 AC

ROOF

- KAST TECH 60
- MATRI-PUMP AR 61
- QUICK CAST® 62



WALLS / HEARTH / RAMP

- MATRIFLO 85 ACX
- MATRI-PUMP 72 ACX
- MATRIFLO 93 AC

ROOF

- MATRI-PUMP 50
- MATRI-PUMP AR 61
- KAST TECH 60

HEARTH & WALLS

- QUICK CAST® 61 ACX
- QUICK-FIRE® 88
- MATRICAST 70 AC



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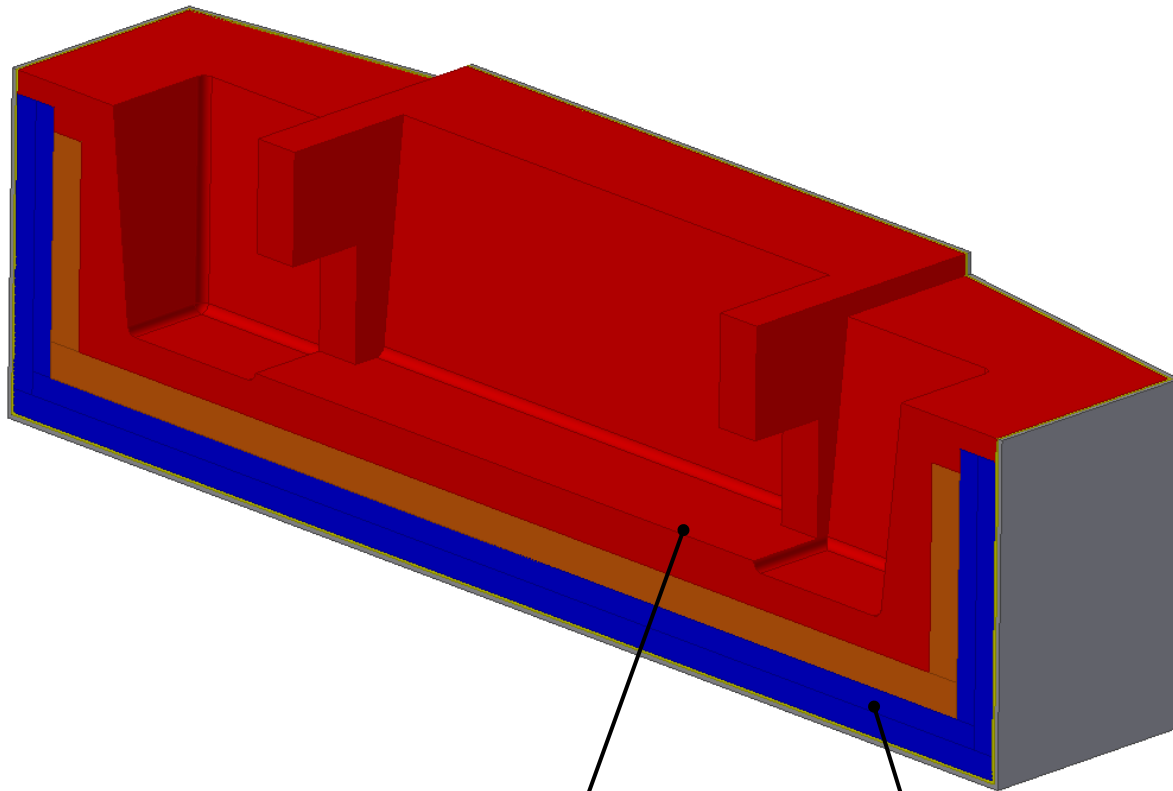
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expansion

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%



FURNACE LINING

MATRIPUMP 63 ACX

MTRICAST 70 AC

MATRIFLO 85 ACX

QUICK-FIRE® 88

SAFETY LINING

DRI-LITE® 79AL-M

MATRILITE 22 AC

MATRILITE 24 AC

in our
element

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ROTARY

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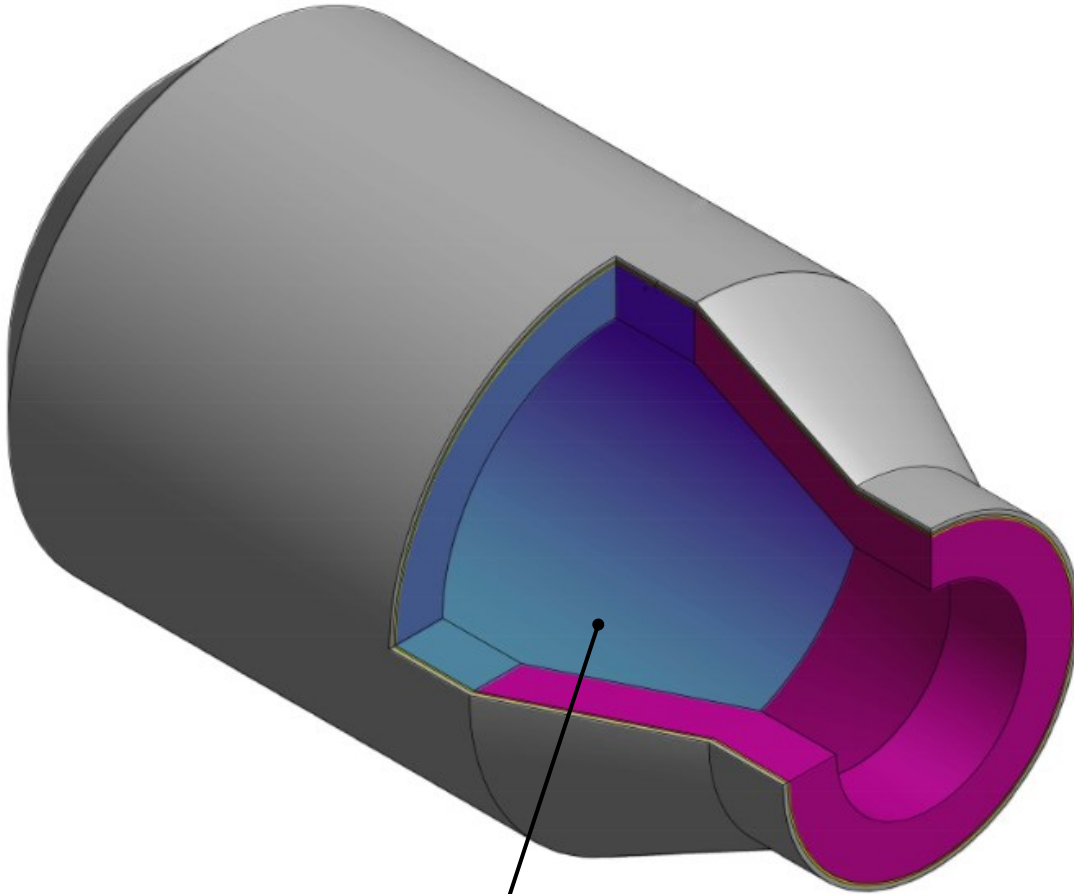


$\alpha \Delta T$

thermal expansion



= %



FURNACE LINING

QUICK CAST® 61 ACX

NANO-TEK 65 AC





SPOUTS

- PHOS FREE PLASTIC FINE
- 90 FINE PLASTIC
- QUICK-FIRE® 88
- PRECAST SHAPES

STRUCTURAL COMPONENTS

- QUICK CAST® 62
- TUFF-FLO 50

WORKING LINING COATINGS

- MINRO-Z WASH Z77
- MATRIKOTE 90 AC
- WASH 148A

PATCHING

- PHOS FREE SEAL
- 90 FINE PLASTIC
- CWHSP90 FINE

COVER

- MINRO-FIRE CAST F80
- TUFF-FLO 50

SLIP PLANE MATERIALS

- VAPORSHIELD
- SINTERFOIL 50
- GM40SRP
- MINRO-WEAVE CLOTH

WORKING LINING

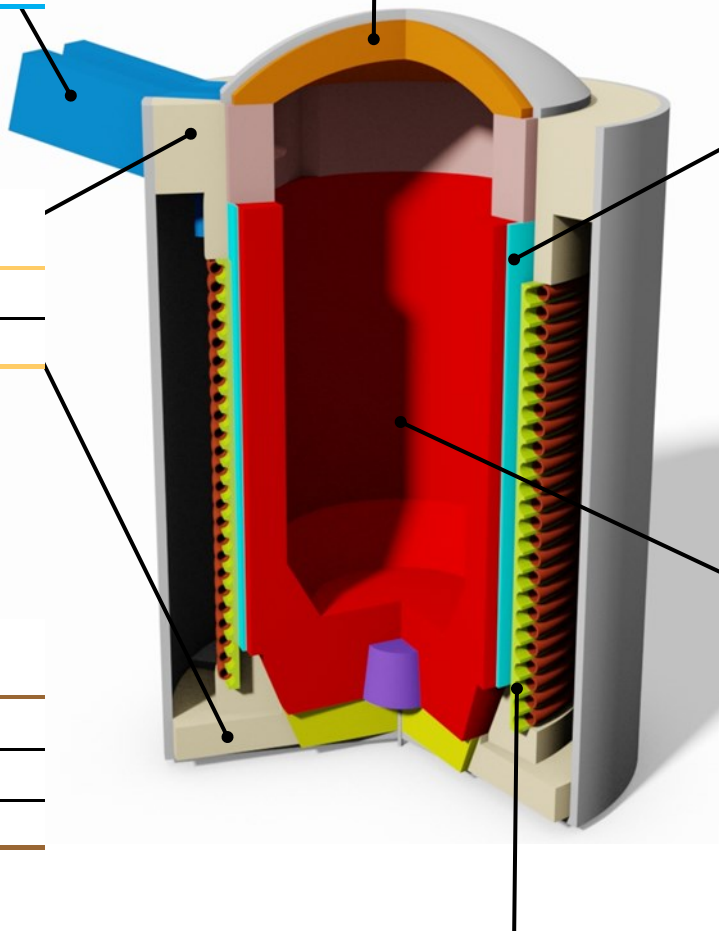
- DRI-VIBE® 520A
- DRI-VIBE® 522A-FR
- DRI-VIBE® 558A-FR
- PRECAST CRUCIBLES

CRUCIBLE BACK-UP

- DRI-VIBE® 88A NB
- DRI-VIBE® 291A

GROUTS

- GROUT 163 ACF
- GROUT 563A
- GROUT 663A
- COIL-CAST 97A





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$$Q = \alpha_s \Delta T$$

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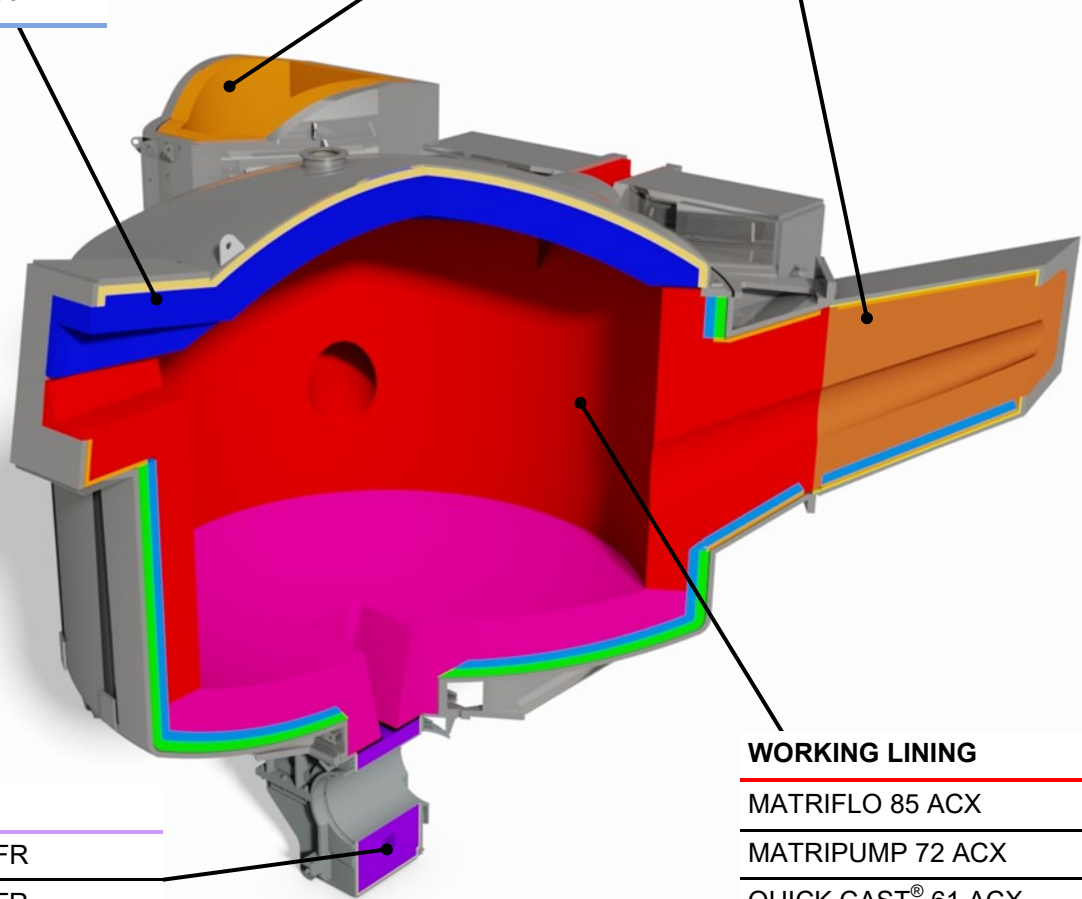
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COVER

- CW 137 CASTABLE
- MATRIPUMP 50
- MINRO-FIRE CAST F80

RECIEVER / SPOUT

- MATRIFLO 85 ACX
- MATRIPUMP 72 ACX
- MATRICAST SiC



INDUCTOR

- DRI-VIBE® 522A-FR
- DRI-VIBE® 558A-FR

WORKING LINING

- MATRIFLO 85 ACX
- MATRIPUMP 72 ACX
- QUICK CAST® 61 ACX





TRANSFER LADLES

HEATED LAUNDRY

COVER

MATRILITE 28 AC

WORKING LINING

MATRIFLO 85 ACX

QUICK-FIRE® 88

QUICK CAST® 61 ACX

BACK-UP LINING

DRI-LITE® 79 AL-M

MATRILITE 22 AC

UNHEATED LAUNDRY

BACK-UP LINING

DRI-LITE® 65 A-L

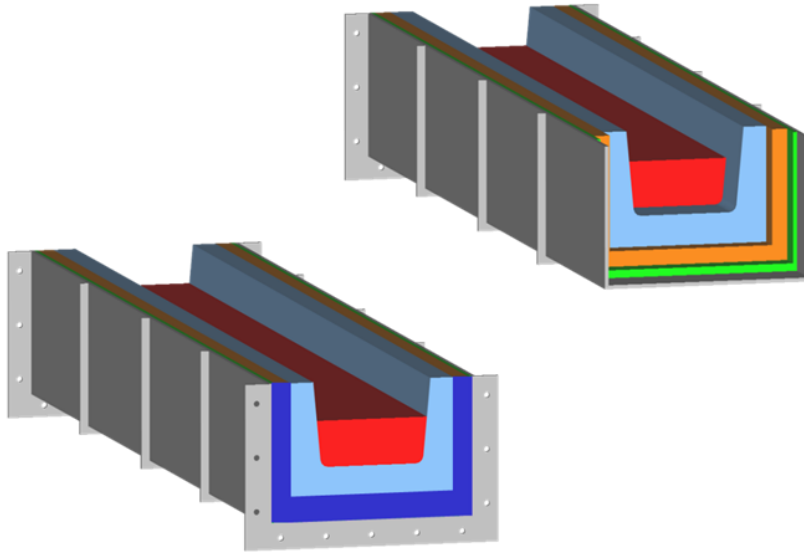
DRI-LITE® 79 AL-M

WORKING LINING

MATRISIL CV

MATRISIL LC

MATRISIL SR



LADLES

REPAIR

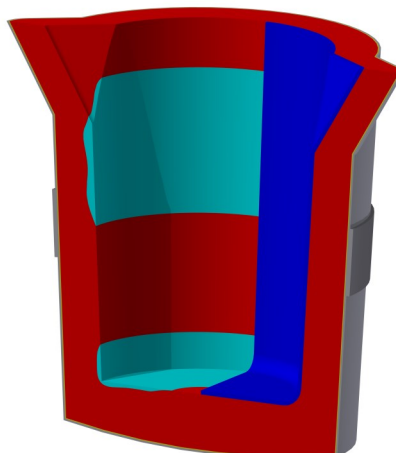
QUICK-FIRE® PATCH B

QUICK-FIRE® PATCH M

COATINGS

MATRIKOTE 90 AC

MINRO-Z WASH Z77



WORKING LINING

QUICK CAST® 61 ACX

MATRICAST 82 SiC

MATRILITE HS AC

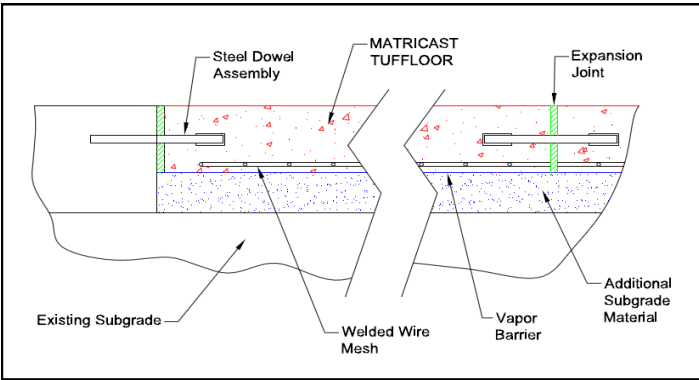


TUFFLOOR is designed for areas exposed to extreme thermal cycling and intermittent exposure to liquid metal spills, dross and slag. It is a versatile product that can be installed as a complete floor, over existing (or new) concrete, or as precast tiles.

TUFFLOOR has over 20 years of proven performance in ferrous and non-ferrous foundries, 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



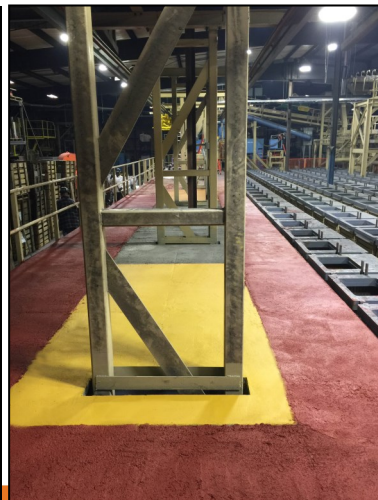
Engineering Design for a High-Load Application



A variety of colors available



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





MAINTENANCE

DRI-CAST	Dry powder product line, designed for patching fractured / worn refractory.
MATRIFLO	Specialty line of metal contact castables.
MATRIGUN / BETAGUN	Gun mixes ranging from super duty to high alumina with a non-wetting additive.
MATRIKOTE	Boron Nitride, zircon and high alumina coatings.
MATRIPHOS	Phosphate bonded plastics that contain an aluminum non-wetting additive.
QUICK-FIRE®	Two-component, phosphate bonded castables & gun mixes. Product ranges from 55% - 90% alumina.
NANO-TEK	No cement castable that can be shotcreted and pumped.
MATRIPUMP FF	Low cement castable that heats rapidly and can be shotcreted.





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TECHNICAL DATA
refractory research

Name	Al ₂ O ₃ %	SiO ₂ %	Density	Max. Temp
ARMORMAX® 70 SR	70.1	25.5	2.66 g/cm ³ (166 lb./ft ³)	1430°C (2600°F)
COIL-CAST 97A	96.6	0.1	3.03 g/cm ³ (189 lb./ft ³)	1650°C (3000°F)
CW 137 CASTABLE	94.5	0.5	1.44 g/cm ³ (90 lb./ft ³)	1816°C (3300°F)
DRI-CAST 581A	70	15	2.64 g/cm ³ (165 lb./ft ³)	1650°C (3000°F)
DRI-LITE® 65A-L	37.6	56.0	0.96 g/cm ³ (60 lb./ft ³)	1400°C (2550°F)
DRI-LITE® 79AL-M	42.9	49.1	1.31 g/cm ³ (82 lb./ft ³)	1370°C (2500°F)
DRI-VIBE® 520A	90.7	4.5	3.04 g/cm ³ (190 lb./ft ³)	1204°C (2200°F)
DRI-VIBE® 522A-FR	80.7	8.3	2.88 g/cm ³ (180 lb./ft ³)	1425°C (2600°F)
DRI-VIBE® 558A-FR	90.7	4.5	3.04 g/cm ³ (190 lb./ft ³)	1095°C (2000°F)
GROUT 163 ACF	91.0	3.1	2.51 g/cm ³ (160 lb./ft ³)	1760°C (3200°F)
GROUT 563A	86.1	4.8	2.72 g/cm ³ (170 lb./ft ³)	1760°C (3200°F)
GROUT 663A	87.6	4.4	2.72 g/cm ³ (170 lb./ft ³)	1760°C (3200°F)
KAST TECH 60	55.9	36.6	2.34 g/cm ³ (146 lb./ft ³)	1649°C (3000°F)
LCF 798A	61.5	35.0	2.64 g/cm ³ (165 lb./ft ³)	1705°C (3100°F)
MATRICAST 70 AC	69.1	25.1	2.58 g/cm ³ (161 lb./ft ³)	1540°C (2800°F)
MATRICAST 2600 AC	45.2	42.4	1.99 g/cm ³ (127 lb./ft ³)	1425°C (2600°F)
MATRICAST 3110C	60.0	32.2	2.39 g/cm ³ (149 lb./ft ³)	1705°C (3100°F)
MATRICAST SiC	63.2	20.0	2.59 g/cm ³ (162 lb./ft ³)	1760°C (3200°F)
MATRIFLO 85 ACX	85.6	8.5	2.74 g/cm ³ (171 lb./ft ³)	1540°C (2800°F)
MATRIFLO 93 AC	92.8	0.4	3.17 g/cm ³ (198 lb./ft ³)	1650°C (3000°F)
MATRIKOTE 90 AC	90.4	1.5	2.88 g/cm ³ (180 lb./ft ³)	1650°C (3000°F)
MATRILITE HS AC	29.3	51.9	1.37 g/cm ³ (85 lb./ft ³)	1290°C (2350°F)
MATRILITE 22 AC	44.1	45.3	1.06 g/cm ³ (66 lb./ft ³)	1205°C (2200°F)
MATRILITE 24 AC	41.8	39.3	1.23 g/cm ³ (77 lb./ft ³)	1345°C (2450°F)
MATRILITE 28 AC	51.2	36.1	1.27 g/cm ³ (79 lb./ft ³)	1425°C (2600°F)



process global refractory research

TECHNICAL DATA

Name	Al ₂ O ₃ %	SiO ₂ %	Density	Max. Temp
MATRIPHOS 70 AC	73.0	19.7	2.59 g/cm ³ (162 lb./ft ³)	1650°C (3000°F)
MATRIPHOS 85 AC	80.7	12.2	2.80 g/cm ³ (175 lb./ft ³)	1650°C (3000°F)
MATRIPUMP AR 61	60.8	34.2	2.47 g/cm ³ (154 lb./ft ³)	1650°C (3000°F)
MATRIPUMP 50	54.3	39.6	2.47 g/cm ³ (154 lb./ft ³)	1650°C (3000°F)
MATRPUMP 51 ACX	50.0	43.6	2.30 g/cm ³ (144 lb./ft ³)	1482°C (2700°F)
MATRIPUMP 63 ACX	65.6	28.5	2.59 g/cm ³ (162 lb./ft ³)	1540°C (2800°F)
MATRIPUMP 70 ACX	73.3	20.5	2.74 g/cm ³ (171 lb./ft ³)	1482°C (2700°F)
MATRIPUMP 72 ACX	78.6	15.6	2.68 g/cm ³ (167 lb./ft ³)	1540°C (2800°F)
MATRISIL CV	22.7	73.4	2.05 g/cm ³ (128 lb./ft ³)	1200°C (2200°F)
MATRISIL LC	20.3	76.3	2.05 g/cm ³ (128 lb./ft ³)	1370°C (2500°F)
MATRISIL SR	22.1	75.0	2.06 g/cm ³ (128 lb./ft ³)	1370°C (2500°F)
MINRO-AL [®] PLASTIC A76	67.3	25.7	2.69 g/cm ³ (168 lb./ft ³)	1650°C (3000°F)
MINRO-FIRE CAST F80	53.2	39.3	2.24 g/cm ³ (140 lb./ft ³)	1650°C (3000°F)
MINRO-Z WASH Z77*	1.2	35.4	-	1650°C (3000°F)
QUICK CAST [®] 61 ACX	65.3	29.0	2.59 g/cm ³ (162 lb./ft ³)	1540°C (2800°F)
QUICK CAST [®] 62	66.1	27.2	2.64 g/cm ³ (165 lb./ft ³)	1705°C (3100°F)
PHOS FREE PLASTIC F	88.2	10.2	2.90 g/cm ³ (181 lb./ft ³)	1730°C (3150°F)
PHOS FREE SEAL	88.7	9.8	2.90 g/cm ³ (181 lb./ft ³)	1730°C (3150°F)
QUICK CAST [®] 81 ACX	76.7	18.7	2.74 g/cm ³ (171 lb./ft ³)	1540°C (2800°F)
QUICK-FIRE [®] PATCH B	78.5	10.0	2.53 g/cm ³ (158 lb./ft ³)	1650°C (3000°F)
QUICK-FIRE [®] PATCH M	62.7	26.2	2.33 g/cm ³ (145 lb./ft ³)	1650°C (3000°F)
QUICK-FIRE [®] 88	88.2	3.9	2.84 g/cm ³ (177 lb./ft ³)	1650°C (3000°F)
TUFFLOOR	35.1	42.5	2.11 g/cm ³ (132 lb./ft ³)	1040°C (1900°F)
WASH 148A	91.7	5.8	-	1700°C (3092°F)

* ZrO₂ 55.0%

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