

## Monofrax® M

### Alpha-Beta Alumina

### Fused Cast Refractory

#### Product Description

Monofrax® M is a fusion-cast alumina refractory containing approximately 40% alpha alumina, 60% beta alumina, and a minor amount of silicate boundary phase. Invented in the 1940s, the Monofrax M product has been successfully used in a wide range of applications in both glass and non-glass industries. It offers excellent corrosion resistance and low defect potential in the conditioning or refining end of a glass melting furnace. Monofrax M is selected for use in metal reduction cells due to its corrosion resistance, and in skid rails application in a steel mill due to its excellent abrasion resistance. Since the mid-1990's it is the primary solution for crowns and superstructure in oxy-fuel fired glass melting furnaces.

#### Manufacturing Description

Monofrax M is produced by melting calcined alumina and soda ash in an electric arc furnace, pouring the liquid into graphite molds, followed by slow cooling of the blocks. This product is available in many shapes and sizes and is produced with and without casting voids. State-of-the-art grinding equipment is used to finish the blocks to a very tight dimensional control and superior surface quality.

#### Typical Chemistry

Al <sub>2</sub> O <sub>3</sub> .....	94%
Na <sub>2</sub> O.....	4%
SiO <sub>2</sub> .....	1%
Other.....	<1%

#### Typical Applications

- Glass furnaces
  - Paving
  - Refiner sidewalls
  - Channels
  - Canals
- Oxy-fuel combustion atmospheres
  - Crowns
  - Superstructures
- Magnesium and titanium reduction cells
- Steel reheat furnace skid rails



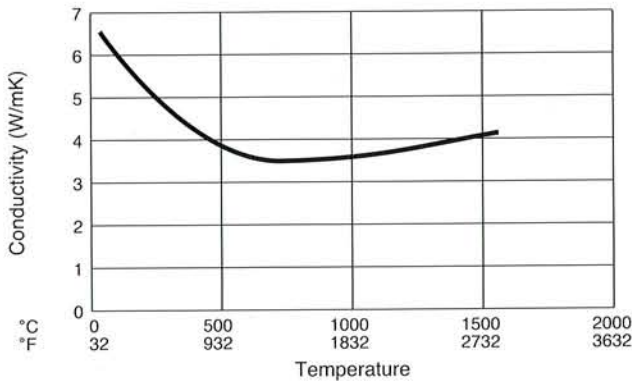
#### Micrograph Description

This photomicrograph illustrates the structural intergrowth of approximately 40% alpha alumina (Al<sub>2</sub>O<sub>3</sub>) and 60% beta alumina. The blocky, irregular crystals are alpha alumina and the surrounding, slightly darker lath type crystals are beta alumina. There is less than 1% glass phase in this product.

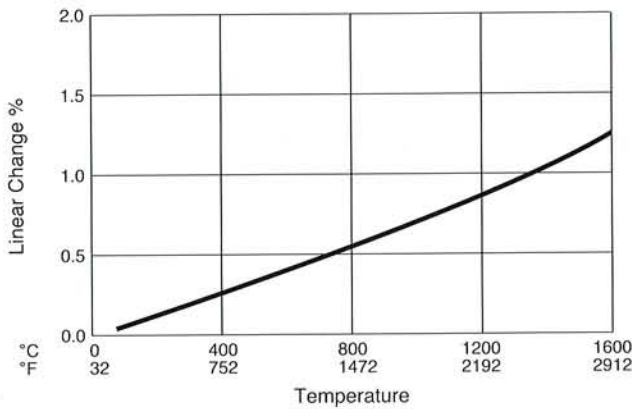


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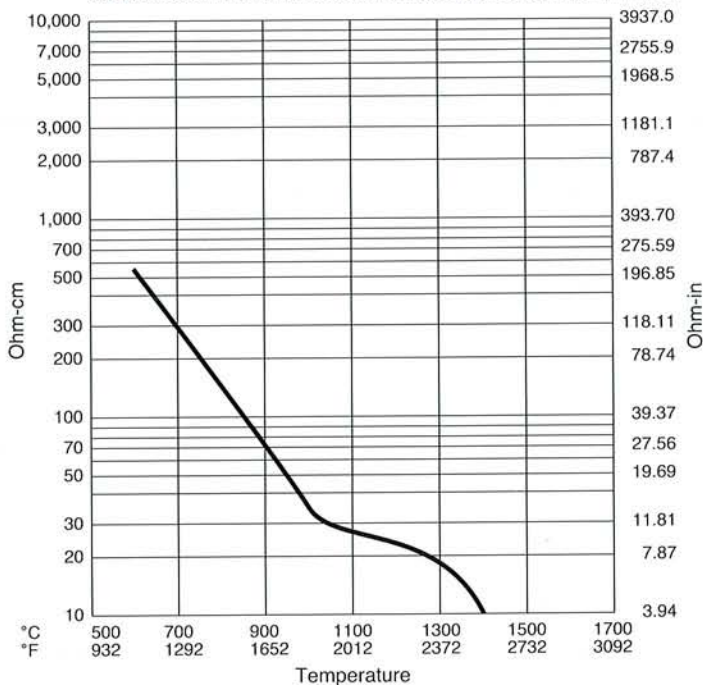
### Typical Thermal Conductivity



### Typical Thermal Expansion' (Refractoriness Under Load)



### Typical Electrical Resistivity



## Monofrax® M Alpha-Beta Alumina Fused Cast Refractory

### Typical Physical Properties:

Bulk Density lb/ft <sup>3</sup> (g/cm <sup>3</sup> ).....	212 (3.40)
(excluding shrinkage cavity)	
Apparent Porosity %.....	<2
Linear Change Under Load % <sup>2</sup> .....	0
Modulus of Rupture	
Cold psi (kg/cm <sup>2</sup> ) <sup>3</sup> .....	3,800 (270)
Hot psi (kg/cm <sup>2</sup> ) <sup>4</sup> .....	3,270 (230)
Cold Crushing Strength psi (kg/cm <sup>2</sup> ) <sup>3</sup> .....	33,000 (2320)

### Available Casting Techniques

- Regular Cast
- DCL (Essentially void-free)

1 ASTM C-832, 29psi  
 2 DIN-51053, 29psi, 100 hours  
 3 ASTM C-133  
 4 ASTM C-583, 2750F, 3 hours

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