

High Reactivity Metakaolin Pozzolan

HIGH REACTIVITY METAKAOLIN (HRM) is a highly reactive pozzolan that reacts with calcium hydroxide produced from free lime during the hydration of portland cement, forming calcium silicate and aluminosilicate hydrates. These cementitious products supplement the binding action in concrete. This formulation provides increased density, resulting in reduced porosity and permeability and increased chemical resistance.

In many ways, the pozzolanic reaction of HRM is similar to that with fly ash, but with HRM the finer particle size and higher surface area enables the pozzolan to react much faster and more frequently.

Benefits of HRM include:

- Increased compressive and flexural strength
- Reduced permeability, efflorescence and drying shrinkage
- Improved durability through increased chemical resistance
- Reduced degradation caused by sulfate attack or the alkali-silica reaction (ASR)
- Improved light color and texture in architectural concrete

HRM is available in two forms:

1. HRM Clinker: A metakaolin “clinker” (3/4" to 1") with good handling ability and resistance to deterioration. This product can be shipped in bulk and is ideal for intergrinding with portland cement clinker for the production of ASTM C 150 Type IP blended cement.
2. HRM Powder: Produced by fine grinding the clinker. Sold in packages, supersacks, or in bulk as ASTM C 618 Type N pozzolan.

Chemical Composition:

HRM is an amorphous aluminosilicate with the following typical analysis (wt%, dry calcined basis):

SiO ₂	51.1 (48 – 53)
Al ₂ O ₃	45.5 (45 – 50)
Fe ₂ O ₃	<1.2
CaO	<0.1
MgO	<0.1
Na ₂ O	<0.1
K ₂ O	<0.3
TiO ₂	<2.2
SO ₃	<0.1
LOI	<2.0
<i>All numbers as % by weight</i>	

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High Reactivity Metakaolin (HRM) is an engineered pozzolanic admixture for use in cement and concrete that is manufactured by calcining kaolinite clay. Controlled blending of the kaolinite, processing and calcinations provide a consistent, high-purity, quality-controlled product with excellent physical and chemical properties.

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Physical Properties:

- Specific Gravity: 2.5 (H₂O = 1)
- Physical Form: Clinker (HRM/C) or powder (HRM/F)
- Color: Off white, 80 – 82 Hunter L Brightness
- Loose Pack Density (clinker): 59 – 61.5 pcf
- Particle Size (powder): Medium 6

