PRIME AEROCON CM

ACRYLIC EMULSION POLYMER FOR CEMENT MODIFICATION

SUMMARY

Prime Aerocon CM is an ammonia free acrylic emulsion, specifically designed to modify cement compositions. Important application areas include:

- patching and resurfacing
- floor underlay
- terrazzo flooring
- spray and fill coats
- pre-cast architectural building panels
- stucco
- industrial cement floors
- cement slurries
- Highway and bridge deck repair.

Characteristics of the Product

Prime Aerocon CM belongs to a new generation of environmentally friendly cement modifiers. It is:

- APEO free
- Ammonia free
- Formaldehyde free

Prime Aerocon CM is an important milestone in the development of environmentally advanced solutions for manufacturers of mortars and concrete admixtures.
The key technical features of performance improvements obtained through the application of **Prime Aerocon CM** are:

- **Strength**: Compared with unmodified mortars, polymer modified mortars have superior flexural, and impact strengths, as well as excellent abrasion resistance
- **Adhesion**: **Prime Aerocon CM** modified cement mortars have excellent adhesion to a variety of substrates such as concrete, masonry, brick, wood, metals, and others
- **Durability**: Cement mortars prepared with Prime Aerocon CM are resistant to many industrial chemicals and have excellent resistance to ultraviolet light and heat
- **Curing Advantages**: Unlike unmodified mortars, which require laborious moist curing conditions for optimum strength properties, polymer modified mortars should be air cured at ambient temperature and standard relative humidity
- **Storage Advantages**: Prime Aerocon CM emulsion is sediment-free and stable to a minimum of five cycles of freezing at -15°C and thawing at 25°C. In the cold or after prolonged storage, it is desirable that the emulsion be thoroughly stirred prior using to ensure a completely homogeneous mixture

Typical Physical Properties

(Not to be used as specifications)

Appearance	Milky white liquid
Solids Content %	47
pH	10
Freeze-Thaw Stability	5 cyles
Specific gravity	1.06
Viscosity	< 100 mPa.s
Minimum Film Formation Temperature	10°C

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FORMULATIONS GUIDELINES

Recommendations

For optimum performance of the polymer modified cement mortar, the following recommendations should be complied with.

Curing Conditions

Air cure conditions should be applied rather than moist cure conditions for optimum polymer film formation properties

Air Content

Air has an adverse effect on mechanical strength properties of cement mortars, as expressed by the Ferret's relationship:

$$\text{Relative mechanical strength} = \frac{k_o}{\left[1 + \frac{D_c + (w + a)}{c(I + k_1 + k_2)}\right]^2}$$

Where

- k = Constant function of cement type
- k_1 = Pozzolanic activity coefficient
- k_2 = Filler activity coefficient
- w = Water content
- a = Air content
- c = Cement content
- Dc = Cement specific gravity

Therefore, when modifying cement mortars with Prime Aerocon CM, it is important to minimise the air entrainment due to foaming at a maximum level of 5% by using an appropriate amount of defoamer.

Water Level

As a general rule and indicated by the Ferret's relationship, water should be held to the lowest amount needed to achieve a suitable working consistency. By using a minimum amount of water, maximum strength properties are obtained. As Prime Aerocon CM shows a marked plasticizing effect, increasing amounts of Prime Aerocon CM used in the cement mortar require decreasing amounts of water for a suitable workable consistency. The following defoamer were found to be efficient in Prime Aerocon CM at a 0.5% level on emulsion:

Defoamer	Supplier
Tego[1] LAE-511	Tego
Drew[2] 210-693	Ashland Chemicals
Byk[3] 037	Byk
Dehydran[4] P-3215	Henkel

Film Formation Properties

Prime Aerocon CM can be used as such in cementitious compositions at ambient temperatures in the range: 10 to 40°C. For optimum film formation properties when working at temperatures below 10°C the addition of a coalescing aid to the emulsion is recommended.

The following coalescing aids can be used up to a 5% level on the emulsion when working at temperatures down to 5°C:

- Texanol[5] (Eastman)
- Dowanol[6] DPnB (Di propylene glycol-nbutyl ether) (Dow Chemicals)
- Butyl carbitol

[1] Tego Chemie Service GmbH, Essen, Germany
[2] Ashland Netherlands bv, Rotterdam, Netherlands
[3] BYK Chemie GmbH, Wesel, Germany
[4] Cognis France, Saint Fargeau Ponthierry, France
[5] Eastman Chemical, ltd, UK
[6] Dow Chemicals Co ltd, West Drayton, UK