

## ALKALI-FREE POWDER ACCELERATOR

### DESCRIPTION

**Conmix AFP** is an alkali-free powder admixture formulated to provide set acceleration in shotcrete, while reducing the safety hazards associated with traditional alkaline shotcrete accelerators. Complies to ASTM C1141, Type I & Grade 9, Class B.

### USES & ADVANTAGES

**Conmix AFP** is suitable for use with shotcrete in tunnels, mines, and for slope stabilisation etc.

#### Advantages include:

- Quick setting.
- Early-age strength development, excellent long-term strength and durability.
- High resistance to carbonation.
- Reducing water permeability.
- Very low dust production.
- Alkali-free and non-toxic, which eliminates any adverse effects from additional alkali's in the spray dust.
- Minimum strength loss in the accelerated concrete.
- No additional surface and ground water pollution by leached out alkalis.
- Improves bond of shotcrete to rock and concrete, making overhead spraying easier.
- Non corrosive to steel reinforcement.
- Improves safety and non-toxic.
- Better adhesion.
- Reduced rebound.

### PROPERTIES

<b>Appearance:</b>	Beige powder
<b>pH Value</b> (10% w/w in water):	Approx. 4.0
<b>Bulk Density:</b>	Approx. 1.10±0.05
<b>Chloride Content (Cl<sup>-</sup>)</b>	<0.01%

### APPLICATION

According to the required setting time and early strengths, **Conmix AFP** can be added at a dosage of 3-7% by weight of binder. Overdosing may result in decreased strength. The dosage depends on temperatures, reactivity of cement used, required thickness of layers, setting time and early strength development required.

It is preferable to use concrete with cement contents of no less than 400 kg/m<sup>3</sup> for high early strength.

**Conmix AFP** can be sensitive to different types of cement. It is suggested to use 100% clinker Portland cement for earlier setting time.

During wet-mix spraying, the w/c ratio should be below 0.5 (preferably below 0.45) to achieve better results. The water content in aggregate must be taken into account in the calculation of water-cement ratio.

### GENERAL INFORMATION - SHOTCRETE MIX DESIGN

#### Typical Shotcrete Mix Design

Ordinary Portland Cement Type I	420 kg/m <sup>3</sup>
River Sand	700 kg/m <sup>3</sup>
Crushed Rock Fines	500 kg/m <sup>3</sup>
Aggregates <10 mm	450 kg/m <sup>3</sup>
Water	189 litre/m <sup>3</sup>

The above is a typical shotcrete mix design excluding superplasticisers, silica fume, steel fibres, accelerators and other additives.

#### Gradation Limits for Shotcrete Aggregate

Sieve Sizes (mm)	% by Weight Passing Individual Sieves		
	Gradation No.1	No.2	No.3
19	-	-	100
12.5	-	100	80-95
9.5	100	90-100	70-90
4.75	95-100	70-85	50-70
2.36	80-100	50-70	35-55
1.18	50-85	35-55	20-40
0.60	25-60	20-35	10-30
0.30	10-30	8-20	5-17
0.15	2-10	2-10	2-10

#### Dry Mix

Dry mix shotcrete must allow for increased rebound composed mainly of larger aggregate, unlike wet mixes increase aggregate contents to allow for loss in application is not a problem. Below is a typical dry mix shotcrete mix design. In dry mix shotcrete usually the only type of admixtures used are accelerators combined with silica fume and steel fibres.

#### Sample Dry Mix (Design 1 m<sup>3</sup>):

Aggregate (Gradation No.2)	1,670 kg
Cement	350-400 kg
Silica Fume (Conmix SF1)	50 kg
Steel Fibres (if required)	40-60 kg

#### Wet Mix

Wet mix design is similar to pumpable concrete mixes. The material must be flowable enough at low water cement ratios to flow through the hose stay in place once blown onto the surface and rapidly gain strength.

Wet mix shotcrete typically contains Superplasticisers (**Conmix SP1**), Retarders (**Conmix R1**), Air Entrainers (**Conair**), Silica Fume (**Conmix SF1**) and steel fibres.

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### Below is a typical wet mix shotcrete design:

Sample Wet Mix (Design 1 m <sup>3</sup> )	
Aggregate (Gradation No.2)	1,600 kg
Cement	420 kg
Silica Fume ( <b>Conmix SF1</b> )	40 kg
Superplasticiser, Water Reducer ( <b>Conmix SP1, Conmix R1</b> )	
& Air Entrainment ( <b>Conair</b> )	5-10 kg
Water (approx.)	210 kg
Steel Fibres (if required)	40-60 kg

Cormix International technical service department is available to advise on shotcrete mix design and the appropriate additives to use.

### Dry & Wet Shotcrete Additives Available from Cormix

#### Dry Mix Additives

<b>Conmix AFP</b>	Alkali Free Powder Accelerator
<b>Conmix GA2</b>	Standard Powder Accelerator
<b>Conmix SF1</b>	Silica Fume
<b>Conmix Steel Fibres</b>	

#### Wet Mix Additives

<b>Conmix GA1</b>	Standard Liquid Accelerator
<b>Conmix AFL</b>	Alkali Free Liquid Accelerator
<b>Conmix SP1</b>	Superplasticiser Admixture
<b>Conmix R1/P4</b>	Retarding & Plasticising Admixture
<b>Conmix SF1</b>	Silica Fume
<b>Conair</b>	Air entraining Additive
<b>Conmix Steel Fibres</b>	

#### PACKAGING

**Conmix AFP** is supplied in 17 kg. plastic lined 3 ply paper bags.

#### STORAGE & SHELF LIFE

**Conmix AFP** should be stored in a dry environment in tightly closed original bags away from moisture contact. In original unopened bags shelf-life is up to 6 months.

#### HEALTH & SAFETY

Wear rubber gloves and goggles to avoid eye and skin contact. If contact occurs, clean with plenty of water. In case of eye contact, seek medical advice.

#### TECHNICAL SERVICE

The Cormix International Technical Service Department is available to assist you in the correct use of our products and its resources are at your disposal entirely without obligation.

#### QUALITY ASSURANCE

ISO 9001 : 2008 verified by TUV Nord.

#### CONTACT DETAILS

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