

## TECHNICAL DATA GUIDE- CONCRETE ADMIXTURE

### SIERRA M909

#### High Range PCE based Superplasticizer for Precast Concrete

##### DESCRIPTION

SIERRA M909 is a modified PCE (Poly Carboxylic Ether) blended with acrylic & hybrid polyamide molecule based concrete admixture used in precast applications such as dry cast, vibro-compressed & extruded concrete mixes with smooth texture and improved aesthetics.

It is formulated to reduce the water content of a concrete mixture with controlled bleed and maintaining good cohesion of concrete while attaining very high early compressive and flexural strengths.

The set hardening properties of the product helps attain higher early strengths without increase in cement contents.

SIERRA M909 confirms to performance requirements of BIS 9103, ASTM C 494 (Type 'F'), BS 5075 and EN934 part2.

##### TYPICAL APPLICATIONS

- For use in precast concrete elements such as hollow core slabs/ voided slabs, precast girder for bridges, tunnel segments, kerb stones, box culverts, etc.
- For ultra-high strength concrete grades up to M100 and high-performance concrete
- Mixes needing water reduction up to 40% and low W/C ratios up to 0.21
- OPC/double/triple/ternary blend mixes with SCMs such as GGBS/ Fly ash/ Silica fume/ Metakaolin & other performance enhancers.

##### FEATURES AND BENEFITS

- Accelerates set times and early hardening of concrete,
- Facilitates early stripping and increases formwork repetitions.
- Higher early strength, ultimate strength & enhanced durability.
- Reduces pre and final vibration of formwork,
- Controlled bleed & reduced stickiness
- Reduces creep and lowers incidence of plastic shrinkage cracks with low permeability in hot climates
- Improves surface finish and prevents surface tear-off.

##### MECHANISM OF ACTION

SIERRA M909 works as a dispersant by preventing the flocculation of fine particles of cement. It consists of a carboxylic ether polymer with long side chains and short lateral chains.

Rapid adsorption of the molecule onto the cement particles; combined with an efficient dispersion & increases the surface of the cement grains to react with water. These dispersants are basically surface-active chemicals consisting of molecules having hydrophilic group attached to a hydrophobic organic chain.

The hydrophilic tip is able to reduce the surface tension of water and the adsorbed polymer keeps the cement particles apart by electrostatic repulsion. The lateral side chains linked to the polymer backbone generates steric hindrance enhancing slump retention.

With the progress of hydration, the electrostatic charge diminishes and flocculation of hydrating product occurs eventually contributing for very high early strength.

These unique polymers accelerate the hydration process of cement and promotes early strength gain without steam curing. This helps in reducing the cycle time, improves the formwork repetition and productivity thus making it an ideal product for precast applications.

##### PERFORMANCE TEST DATA

Appearance	Light Brown Free Flowing Liquid
Relative density	1.106 ± 0.02 @25°C
pH	≥6
Chloride ion content	<0.2%





## DOSAGE

Optimum dosage rates of SIERRA M909 vary between 0.4% - 1.2 % by weight of cementitious materials.

Exact dosage rate depends on:

- Quality & quantity of binders & W/C ratio
- Gradation of fine aggregates
- Ambient temperature & site conditions
- Performance requirements.

The correct quantity of SIERRA M909 should be measured by means of a recommended dispenser and should preferably be dispensed after pre-wetting of aggregates.

## RE-DOSING OF ADMIXTURE

Considering the challenges at sites CBS has formulated a high dispersing admixture which is compatible and can be used for re-dosing on unavoidable circumstances.

Depending on the slump required and time elapsed for concrete premixed with SIERRA M909, an additional dose of (say up to 0.4%) by W/C may be added to regain workability loss and compensate for water loss in mixes. This may not adversely affect the ultimate strength of concrete and may also achieve higher strengths than normal concrete.

## WORKABILITY

The intrinsic behaviour of PCE admixtures offers no delayed retardation even with prolonged slump life when compared to SNF based admixtures.

Noticeable delayed retardation occurs when sulphate resisting cements/supplementary cementitious materials are used and ambient temperatures are low. The carefully selected imported components disperse well on low slump concrete and enhance the slump to workable condition. This polymer will not delay concrete retardation, ultimate strength and offers ON-TIME setting and similar strengths.

## EFFECTS OF OVERDOSING

Severe overdosing of SIERRA M909 (say above 0.4%) can lead to high workability mixes with segregation & bleeding, prolonged duration of initial and final set times, increased air entrainment and plastic shrinkage cracks.

## COMPATIBILITY

SIERRA M909 is compatible to be used in combination with water proofing admixtures, air entrainers, accelerators, retarders, corrosion inhibitors and shrinkage reducing admixtures.

Please consult technical department of CBS Chemicals for recommendation before adding other admixtures.

## PACKAGING

SIERRA M909 is supplied in 210 Litre HDPE drums; alternatively 1000 Litre IBC's and bulk deliveries can be arranged.

## STORAGE & SHELF LIFE

SIERRA M909 should be stored in a shaded cool and dry place. Shelf life of SIERRA M909 is 12months from the date of manufactured if kept in unopened, undamaged, original sealed packaging and kept within the range of 10°C to 50°C. If the product is frozen, thaw at +5°C or above and remix with mild agitation.

Failure to comply with recommended storage may deteriorate the product or packing.

## HEALTH & SAFETY

SIERRA M909 is water based, non-flammable and non-hazardous. However it should not be swallowed or allowed to come into contact with skin and eyes. Suitable protective gloves and goggles should be worn. Splashes on the skin should be removed with water. In case of contact with eyes rinse immediately with plenty of water and seek medical advice. If swallowed, seek medical attention immediately - do not induce vomiting. For further information refer to the material safety data sheet.

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