

CEMEK-RSET80AA

Product Technical Data Sheet

Modified Liquid Silicate based Accelerator for Cement Grouting, Soil Stabilisation, Rock Stabilisation and Shotcrete & Gunite

Introduction

Sprayed concrete, or shotcrete, is used worldwide to construct tunnels or underground structures. The poured mix must set quickly in order to stabilize the structure [1-2]. The important basic requirements of shotcrete are good adhesiveness, a low amount of rebounding, good shooting, and the quick formation of initial strength [3-4]. To meet these requirements, accelerators have become a fundamental additive in shotcrete to achieve appropriate initial strength, reduce rebound, and suppress early ground relaxation. This affects not only the early strength of the shotcrete but also the development of long-term strength, durability and thickness. Traditionally, shotcrete's quick-setting properties have been achieved by the injection of high-alkaline additives at the spraying nozzle. Accelerating admixtures are composed of chemicals that influence the rate of cement hydration, thereby shortening the setting time and, in some cases, increasing the rate of early strength development [3]. Set accelerators affect both the C3A hydration (by interfering with the C3A – gypsum reaction) and the C3S hydration (aiding the dissolution of lime) [5-6]. However, this method resulted in concrete with high porosity and density, low strength and durability, and environmental concerns. Nowadays, shotcrete accelerators are classified as silicate-, aluminate-, or alkali-free, cement-based minerals, depending on the main material that is present. The sodium silicate accelerator gives a rapid initial set and a slow final set, while the aluminate accelerator provides a slow initial set and a fast final set. Both types suffer the same deficiency of loss in strength and durability over the long term. Furthermore, their strong alkalinity may endanger workers and lead to environmental contamination. Increasing the accelerator amount adds to the cost and also increases the rebound ratio [1,7]. To mitigate these issues, alkali-free and cement-based mineral accelerators (CMs) that are environmentally friendly and provide good long-term strength are now frequently used in construction sites. Sodium silicate-based admixtures are more effective – in terms of set acceleration - and cheaper than alkali-free products. For these reasons, sodium silicate accelerators are widely used in tunnel linings. However, a very fast increase of early

strength development in sodium-accelerated shotcretes is followed by a sharp reduction of mechanical properties of concrete at later ages. For many years, fibers of different nature have been used to reinforce shotcrete in tunneling applications. Several research investigations have ascertained the significant effect of fiber addition on ductility and punching resistance of tunnel segments and shotcrete panels [8]. Currently, concrete is reinforced by using steel, glass, polypropylene or acryl-nitrile fibers and carbon nanotubes in order to assess the stress level in reinforced concrete elements [9-13]. To improve durability in severe conditions and to favor replacement of temporary solutions requiring subsequent cuttings glass fibers and glass fabric solutions are used [8,14-16]. To increase fire resistance and prevent explosive spalling of concrete cover polypropylene fibers are used [17]. Compared with traditional steel mesh, fibers arrange themselves in three-dimensional directions inside the cement matrix and they are able to absorb the tensile stress induced by shrinkage and thermal gradients. Therefore, fibers could limit crack width and increase the energy absorption capacity (toughness) of the material [18]. In particular, fibers determine a considerable improvement in the post-cracking behavior of concrete [19]. Reference concrete fails suddenly once the deflection corresponding to the ultimate flexural strength is exceeded; On the other hand, fiber reinforced concrete continues to sustain considerable loads even at deflections considerably in excess of that of the reference concrete. So, compared to reference concrete, fiber-reinforced concrete is tougher and more resistant to impact [18], permitting control of the local detachment of tunnel linings [7,20-21]. The paper presents research results on rheological and mechanical properties of reference and fiber - reinforced shotcretes manufactured with sodium silicate accelerator and glass, steel and polypropylene fibers

Description

CEMEK-RSET80AA is a quick setting admixture available in liquid form for use with sprayed concrete or gunite.

Uses

CEMEK-RSET80AA is used for sprayed concrete and mortar in galleries and tunnels, for retaining walls, embankment and tank linings etc. **CEMEK-**

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RSET80AA admixed mortar sets rapidly hence, quick placing of the wet mortar is essential Accelerator for Cement Grouting, Soil Stabilisation, Rock Stabilisation and Shotcrete & Guniting.

Advantages

- ❖ Allows spraying to take even on wet surface subject to slight infiltrations.
- ❖ Rapid setting speeds up the work and contributes to good water-tightness of the sprayed concrete linings.
- ❖ Improves overhead spraying and reduces rebound.
- ❖ Excellent for overhead application and does not contain any chlorides or nitrates and hence does not corrode.

Properties

S. No.	Properties	Observations
1.	Form	Liquid
2.	Colour	Hazy
3.	Specific Gravity (27±2°C)	1.38±0.02
4.	Chloride Content	Nil (as per EN 934)
5.	Air Content	Nil
6.	Nitrates	Nil

Consistency

CEMEK-RSET80AA is formulated from modified silicate materials and is manufactured under controlled conditions to give a consistent

Product Handling

CEMEK-RSET80AA is formulated from chemicals free from fire or health hazards.

Storage & shelf life

If stored in undamaged sealed containers in dry condition at normal ambient temperature preferably, a Shelf Life of 06 Months can be expected.

Method of use

CEMEK-RSET80AA can be used with either the 'wet' or 'dry' mix shotcrete process at an average of 3% to 7% by weight of cement. Increased dosage may be required for 'Flash Set'. Dosing up to 10% is

permissible depending upon site requirements. Material must be stirred well before use to avoid any kind of settlement at the bottom.

Rate of addition

The optimum dosage should be determined by site trials. As a guide the rate of addition is generally in the range of-

S. No.	Dosage of CEMEK-RSET80AA by weight of cement @ 27±2°C	Setting Time (Minutes)	
		Initial	Final
1.	3%	15	65
2.	5%	7	12
3.	7%	5	8

and cement replacement material such as PFA, GGBFS and Silica Fumes.

Packing

Product is available in 25 Kgs & 250 Kgs drums.

Health & Safety

- ❖ Avoid contact with eyes, mouth and skin
- ❖ Seek immediate medical attention, if accidentally ingested or comes in contact with eyes, mouth & skin

Information

Although the basic formulation of our products generally remains unchanged production refinements arising from continuing research and evolution program may occasionally results in marginal changes in properties.

Warranty

Our products are manufactured under stringent National / International quality norms and guaranteed against any manufacturing defect. Recommendation as per this data sheet are based on our team's combined practical experience and exposure over several years in the field of construction and are believed to be most appropriate. However, no liability can be accepted by us, as the conditions of use of such products are beyond our control.

Disclaimer

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The above data is based on our industry knowledge and does not constitute a guarantee for any specific product. A legally valid contractual relationship, can therefore, not be established.

FIRST AID!

- ❖ Eyes and skin: Flush eyes with water for 15 minutes. Contact a physician if irritation persists.
- ❖ Wash skin thoroughly with soap and water. Remove and wash contaminated clothing before reuse. Inhalation: Remove subject to fresh air. Swallowing: Dilute by giving water to drink and contact a physician promptly.
- ❖ Never give anything to drink to an unconscious person.

Note: - keep out of reach of children for professional and industrial use only

Products Range of CEMEK

- ❖ Alkali Free Accelerator for wet Shotcrete in Liquid form
- ❖ Alkali Free Accelerator for Dry Shotcrete in powder form.
- ❖ Modified Sodium Silicate based accelerator for Shotcrete.
- ❖ Integral Water Proofing Compound.
- ❖ Crystalline Water Proofing Compound.
- ❖ Heat Resistance Coatings/Paints with application
- ❖ Cement, Micro Fine Cement, Epoxy, PU and Colloidal Silica based grouts with application.
- ❖ Wax Based, Resin Based and Resin Based Aluminized Concrete Curing Compound.
- ❖ Ready to use High Strength, Rapid Set, Non-Shrink, Self-Levelling, Crack Repair, Heavy Duty Machine Installation product.

Services

- ❖ Water Proofing (Epoxy, PU, Acrylic, SBR etc.)
- ❖ Dry & Wet Shotcrete
- ❖ Crack Repairing
- ❖ PU, Epoxy, Polyester Grouting (Tunneling & Mining & Structures)

House, Industrial & Institutional Cleaners

- ❖ Steelness Steel Cleaner
- ❖ Degrease & Oil Removers
- ❖ Paint & Coating Striping Agents
- ❖ Concrete Removing Agents
- ❖ Tar Removing form car body
- ❖ Rust Removing Agent
- ❖ Rust Converter

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