

HIGH PERFORMANCE MODIFIED SUPERPLASTICIZER FOR CEMENT

Technology Overview

To increase workability of concrete, aqueous solutions of superplasticizers are added to cementitious mixtures. The strength of concrete is inversely proportional to water content that is used in the mixing process. Superplasticizers are used to lower the water to cement ratio while keeping necessary fluidity to make high performance concrete. Although conventional superplasticizers (e.g., melamine and naphthalene based polycondensates) reduced amount of water needed for workable mixtures, their ability to retain flow over time is limited. New generation of superplasticizers (i.e., polycarboxylate ether-based superplasticizers (PCEs)) exhibit superior dispersing ability compared to the conventional superplasticizers due to their special chemical and structural properties. PCEs have ionizable groups in the backbone to adsorb to the surface of cement particles and also contain side chains (i.e., poly(ethylene oxide)) that protrude from the cement surface into the pore solution to produce steric hindrance effect.

Technology Features & Specifications

The present technology provides high performance modified PCEs. Without using any chain transfer agent and complex initiator system, molecular weight of the polymer is controlled by pre-adjustment of pH level of the polymerization medium. Since the pH level of the final product is 7~8, neutralizing step at the end of the process is eliminated. Initial reaction medium contains all the monomers such that the step of the gradual addition of monomers throughout the reaction is eliminated and also addition of the initiator is limited to two parts; at the beginning and in the middle of the reaction.



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Potential Applications

- Superplasticizer for different types of cement
- Dispersing agents for the processing of ceramics

Customer Benefits

This modified product exhibits higher fluidity and slump retention compared to commercially available superplasticizers and remains effective in medium with high concentration of sulfate ions.

This technology also provides a simple-cost effective and environmentally friendly production method of such additive.

Market Trends & Opportunities

The global construction chemicals market (2015–2020) is estimated to reach USD 33.98 Billion by 2020 growing at a rate of 7.62% between 2015 and 2020.

The highest opportunities for growth of construction chemicals is expected from residential and infrastructure projects. Cement is considered as one of the key enablers for modern construction. Concrete is used as an essential material for all types of construction; including residential, non-residential, industrial, and civil engineering. Besides rising use of advanced PCE-based superplasticizer formulations with viscosity modifying and high-strength water reducers in precast applications is expected to boost the overall demand for concrete admixtures. Polycarboxylic-ether (PCE) is expected to witness highest growth in consumption among super-plasticizers due to its high water-cement reduction at comparatively lower dosage rates.