OPTEVA™ ESE®

A family of non-chloride early strength-enhancing additives

Product Description

The OPTEVA™ ESE® series of additives, which involve a newly developed modified alkanolamine, are available for use to enhance the early strength of cement. Unlike other early strength enhancers, OPTEVA™ ESE® cement additives provide their performance benefit without the use of chloride or thiocyanate ions.

OPTEVA™ ESE® products are available in a variety of formulations that are optimised to maximise their performance in different cement types and compositions. All products are also formulated to provide the benefits of traditional grinding aids such as increased grinding efficiency, and reduced pack set of finished cement.

Physical Properties

Product specifications for the most widely used OPTEVA™ ESE® formulations are as follows:

PRODUCT	SG	PH
OPTEVA™ ESE® 142	1.03 - 1.08	10.0-12.0
OPTEVA™ ESE® 342	1.12 - 1.16	9.5 - 11.5
OPTEVA™ ESE® 134	1.03 - 1.08	10.0 - 12.0
OPTEVA™ ESE® 242	1.03 - 1.08	10.0 - 12.0
OPTEVA™ ESE® 223	1.05 - 1.1	9.5 - 11.5

Specifications for other OPTEVA™ ESE ® products are available through GCP Applied Technologies Field Engineers.

Benefits

The use of OPTEVA™ ESE® cement additives has been shown to increase the early strength (1, 2 and/or 7 Days) of cement without the addition of chlorides, thereby allowing its use in cements already rich in chloride. OPTEVA™ ESE® additives have performed in all types of cement, including Ordinary Portland and cements blended with slag, fly ash and/or limestone.

Early strength (2 Days) increases of up to 22% (versus a blank) have been demonstrated in trials. The resultant high early strength can be used to meet specific market needs or, if desired, the cement producer can trade off the strength increase for reduced cement fineness and lower unit production costs. This in turn will result in production increases that can greatly benefit plants that are operating at or near their grinding capacity. Alternatively, the producer can choose to increase the amount of filler in the cement, while retaining the previous level of early strength.

The choice of any of these three options will result in incremental savings and/or revenue gains.

Recommended Addition Rate

According to GCP experience, the dosage of OPTEVA™ ESE® ranges from 250-700g / t of cement. The optimum addition rate of OPTEVA™ ESE® cement additives should be determined through cement mill tests in consultation with GCP personnel.

Case Study

Performance of OPTEVA™ ESE® vs Traditional Chloride-containing Early Strength-enhancers

Compressive Strength (MPa): EN 196/1 Mortar 6.52-7.93

CEMENT TYPE	I 52.5 R	I 52.5R	% CHANGE
Clinker %	95.0	95.0	
Gypsum %	5.0	5.0 %	
Chloride-based Quality Improver (kg/t)	1.300	-	
OPTEVA™ ESE® 242 (kg / t)	-	0.37	
Blaine Fineness (cm^2 / g)	4331	4290	-0.95
Mill Output (t / h)	50	51.7	3.4%
W/C Ratio	0.50	0.50	% Change
	Chloride Quality Improver	ESE 242	% Change
Compressive Strength (MPa): EN 196/1 Mortar			
1 day	27.8	28.0	0.72
2 days	41.4	44.1	6.52
28 days	68.1	73.5	7.93

Application of OPTEVA™ ESE® Cement Additives

Laboratory mill evaluations of clinker and other additions are recommended prior to field use in order to determine initial blend proportions, evaluate performance parameters and to enable GCP to formulate the most effective OPTEVA™ ESE® product for the specific field use conditions. To arrange for a laboratory evaluation, contact your local GCP Field Engineer.

Compatibility

The performance of concrete admixtures and the physical properties of concrete are not adversely affected by the use of OPTEVA™ ESE® additives in cement production. OPTEVA™ ESE® additives, and cement treated with OPTEVA™ ESE® additives, are compatible with all commercial concrete admixtures, including air entrainers, water reducers, retarders and superplasticisers.

How to Use

OPTEVA™ ESE® products are sprayed into the mill's first compartment or added onto the clinker or feed conveyor belt. All additives should be accurately proportioned through a calibrated dosing system suitable for the cement mill and for the required output. GCP can provide advice on all types of dosing equipment, including manual, semiautomatic, automatic and computerised systems.

Quality Control

OPTEVA™ ESE® products are carefully controlled and accurately blended for constant quality and optimum performance. OPTEVA™ ESE® products are ASTM C 465 approved for use in the USA.

Packaging

OPTEVA™ ESE® Early Strength-enhancing Additive is supplied in 210L drums. OPTEVA™ ESE® products may also be supplied in bulk in certain locations. It contains no flammable material.

Storage

OPTEVA™ ESE® products should be protected from freezing. Once frozen, the product should be thawed out slowly and remixed thoroughly prior to use. Shelf life is minimum 12 months if kept in manufacturer's containers.

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