



Fosroc Grinding Aids & Performance Enhancers **CEMAX Technology**

www.fosroc.com



constructive solutions

ABOUT FOSROC INTERNATIONAL

Since the company's beginnings over 80 years ago, Fosroc has developed into an International leader in delivering Constructive Solutions for projects across a broad range of market segments including transport, utilities, industrial and general buildings.

Fosroc's commitment to customer service and technical support is second to none. We work closely with architects, structural engineers, contractors and owners to best understand their requirements. Together we can develop a bespoke solution for a construction project, adding value and becoming more than just a materials supplier, but a solution provider.

Fosroc has an extensive network of offices and manufacturing locations across Europe, the Middle East, Africa, India, North, South and East Asia, and is further represented in other regions across the world by distributor and licensee partners.

Selecting from the full portfolio of Fosroc products and services and integrating expert technical support, world class customer service and innovation, Fosroc goes beyond just product selling to ensure that we partner with our customers to deliver complete constructive solutions.

- > Admixtures
- > Adhesives
- > Protective Coatings
- > Concrete Repairs
- > Industrial Flooring
- > Grouts & Anchors
- > Joint Sealants
- > Surface Treatments
- > Grinding Aids
- > Waterproofing



FOSROC DELIVER SOLUTIONS NOT JUST PRODUCTS

CAD Details

A library of standard CAD details are available, bespoke CAD details can be created for your specific project

Project Specifications

Dedicated specification managers on hand to assist with correct system choices and tailored solutions

Site Support

Expert product and application support made available from our specialist teams.

Seminar & Training

Comprehensive programme of seminars and training courses designed to expand and reinforce your knowledge.

Leader in delivering
Constructive Solutions
Worldwide!



CONSTRUCTIVE & SUSTAINABLE SOLUTIONS TO CEMENT MANUFACTURERS

Fosroc has developed Cemax - A unique product solution which focuses on adding value to cement production, considering all aspects relating to cement manufacturing process.

Fosroc's Cemax works in number of different ways to improve the efficiency and effectiveness of grinding action during production and providing important application benefits in terms of Flow, Compressive Strength and Consistency of finished product.

Cemax works as a "Grinding Aids & Performance Enhancer" to meet various objectives of cement plants for their comminution process like Cement Mill, Raw Mill and Coal Mills.

Fosroc's Cemax range of grinding aids and performance enhancers can save up to 40% of grinding cost.

Cemax Products

- > Grinding Aids for Cement Mill
- > Performance Enhancer/Quality Enhancer
- > Special additives like Raw mill and Coal mill grinding aids



BENEFITS OF CEMAX TECHNOLOGY

- > Reduced agglomeration
- > Improvements in: energy consumption, cement fineness & mill output
- > Improved consistent quality of cements with better flow characteristics
- > Improved particle size distribution
- > Increased strength
- > Increased composites addition rate in the cement
- > Improved setting time, especially in the cases of PPC and PSC



BENEFITS TO CEMENT MANUFACTURERS

Grinding Aids

- > Increased mill output
- > Improved particle size distribution
- > Improved Pack Set Index (flowability)

Performance Enhancer/Quality Enhancer

- > Improved strength of cement
- > Improved desired quality of cement
- > Increased mill output
- > Improved cement Pack Set Index (flowability)

Special Additives

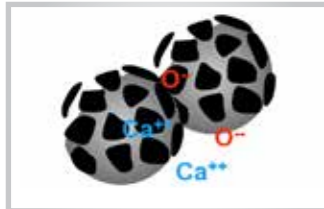
- > Improved cement properties

CEMAX SOLUTION TO REDUCE AGGLOMERATION IN CEMENT GRINDING

Cemax Products

- > Reduced agglomeration
- > Increased mill output
- > Reduced cement Pack Set Index (Improved powder flowability)

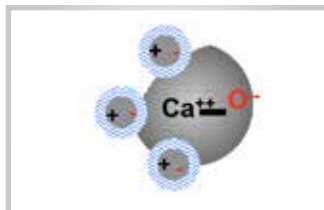
Mechanism of agglomeration



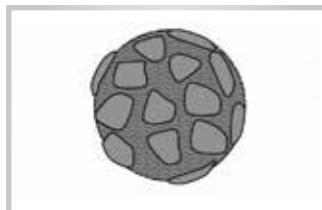
Cement particles agglomerate between each others due to static charges



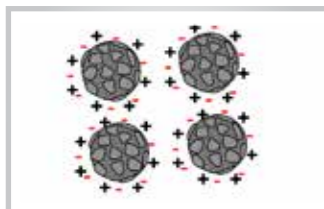
Re-agglomeration continues during grinding process



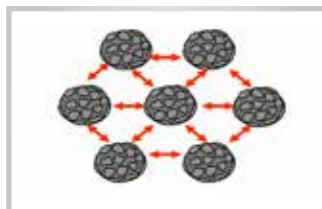
CEMAX highly dipolar organic, adsorbs onto clinker



CEMAX adsorbs into small cracks clinker, saturate the changes and reduce the surface energy forces



CEMAX neutralizes electrostatic changes on newly formed cement particle surface



Neutralized particles - reduce agglomeration between cement particles



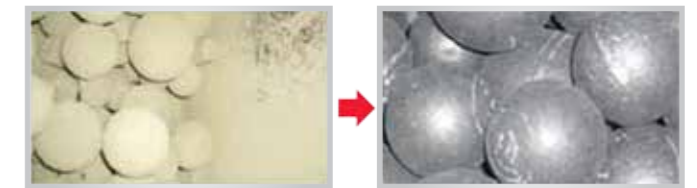
GRINDING AID ACTIONS

- > CEMAX is an organic compound that mostly active in the mill through adsorption on the particle surface
- > It generates a very thin monomolecular film around the particles which soften electrovalence bonds as well as neutralize electrostatic charges on the particle edge
- > Electrovalences of its organic group component act on the calcium (Ca⁺⁺) and oxygen (O⁻) bond. Ion formed by CEMAX, (OH-(CH₂)_n) neutralized all electrostatic charges on the clinker and cement particles which eliminate coating and provide higher fluidity of the ground materials

Benefits

- > Increased Mill Output
- > Reduced production cost per unit of cement
- > Improved cement flowability/Reduced Pack Set
- > Improved Mill Equipment Performance

CEMAX - GRINDING AID ADVANTAGES



Values

- > Improved Mill Efficiency
- > Reduced recirculation load
- > Reduced Blockages in Diaphragms and grinds
- > Reduced Equipment wear and tear
- > Reduced Silo outlet blockages and caking
- > Improved cement transportation efficiency



CEMAX PERFORMANCE ENHANCERS

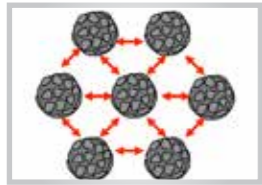
Introduction

- > Performance enhancer improves clinker grindability and cement quality by advanced chemical reactions
- > It is a second generation of cement additives
- > More and more companies now prefer to use Performance enhancers depending on the local cement market requirements and maturity

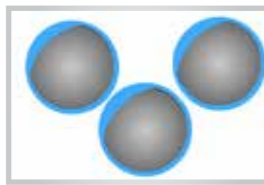
Benefits

- > Enhanced cement quality
- > Reduced agglomeration
- > Increased mill output
- > Reduced cement Pack Set Index (improved powder flowability)

CEMAX - Grinding Aids Advantages



CEMAX molecules adsorb onto newly formed cement particles, reduces agglomeration



Individually, CEMAX molecules enhance cement performance according to specific requirements

PERFORMANCE ENHANCERS ACTIONS:

Higher Early Strength & Faster Setting Time

- > Optimization of the particle size distribution
- > Acceleration of the hydration of C3A, CEMAX accelerates the formation of Ettringite as well as its transformation into monosulphoaluminate to improve cement early strength

Reduce Pack Set Index

- > Ion formed by CEMAX neutralized all electrostatic charges on the clinker and cement particles which eliminate coating and provide higher fluidity of the ground materials

Higher Late Strength

- > Accelerate the hydration of ferrite phase, later, it leads to the promotion of silicate phases hydration which lead to better late strength enhancement.

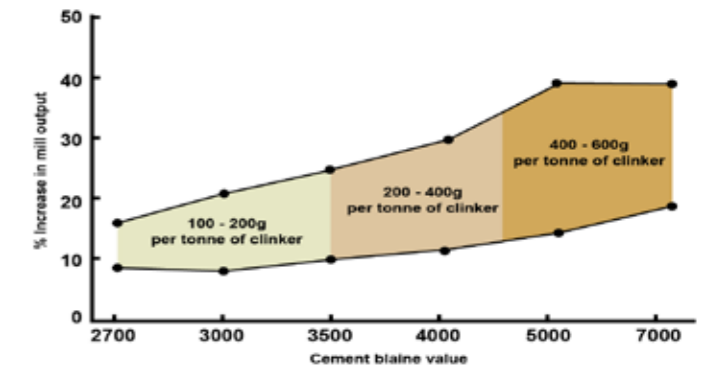


Benefits

- > Improved cement quality by solving the following:
 - > Low quality clinkers
 - > New requirements from customers and market
- > Improved plant profitability by producing cement with lower clinker content
- > Increased cement mill output

Values

- > Reduction in equipment wear and tear
- > Producing better and unique type of cement
- > Reduction in CO₂ Emission through clinker replacement
- > Improvement in plant operation similar to the effects of grinding aids



Reduces production cost and improves cement plants profitability



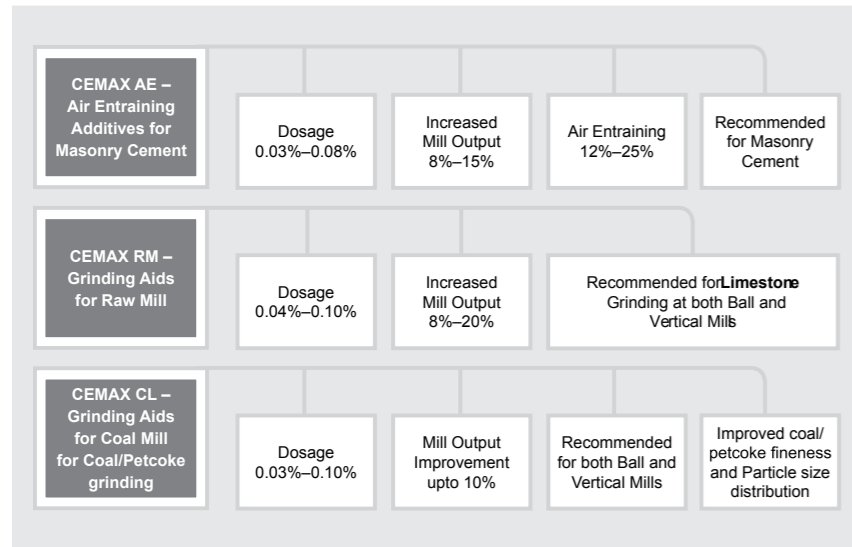
Improves cement physical properties which will improve cement quality and allow higher clinker replacement

CEMAX - Performance Enhancer Advantages
The FUTURE is insight...

CEMAX SPECIAL ADDITIVES

Benefits

- > Enhanced SPECIFIC cement quality
- > Applied for special type of cement
- > Applied at specific process in cement production



LATEST PRODUCTS



Higher Performance Grinding Aids

- > Allow higher mill output for challenging situations
- > Mill output can be increased by up to 20%
- > Higher power cost saving for cement plants
- > Grinding slag cements
- > Grinding limestone cement
- > Grinding hard clinkers
- > Grinding hot clinkers
- > Allow higher power reduction

High Performance Early & Late Strength Enhancers

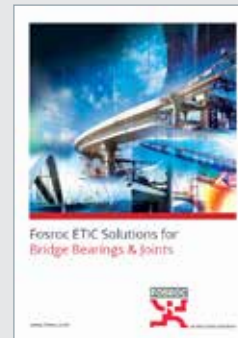
- > Cement early strength can be increased by up to 20%
- > Allow higher addition of fillers such as Pozzolana, PFA & Slag
- > Cement late strength can be increased by up to 15%
- > Allow higher addition of fillers such as limestone up to 25%
- > Low dosage application
- > High value for money
- > Higher clinker replacement - subject to local standard

PRODUCT SELECTION

Additive Types	Fosroc Products	Application										Type of Materials							Mill Type									
		Increase Production	Save power per unit	Reduce Pack Set	Increase early strength of cement	Increase late strength of cement	Reduce water demand	Reduce setting time	Delay setting time	Entrain air	Improve water repellency	Improve water retention	Ordinary Portland Cement	Portland Pozzolana Cement	Portland Fly Ash cement	Portland Slag Cement	Portland Limestone Cement	Portland Composite Cement	White Cement	Masonry Cement	Limestone	Coal & Petcoke	Horizontal Ball Mill	Vertical Roller Mill				
CEMAX Grinding Aids and Performance Enhancers	CEMAX 102S																											
	CEMAX 135																											
	CEMAX 235ES																											
	CEMAX 300G																											
	CEMAX 303																											
	CEMAX 303C																											
	CEMAX 311S																											
	CEMAX 315																											
	CEMAX 316																											
	CEMAX 322																											
	CEMAX 327																											
	CEMAX 333																											
	CEMAX 333L																											
	CEMAX 334M																											
	CEMAX 350																											
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CEMAX 599																												
CEMAX 616E																												
CEMAX 625PC																												
CEMAX 673																												
CEMAX 675																												
CEMAX 691																												
CEMAX 697VN																												
CEMAX 699																												
AURACEM High Performance Grinding Aids & Performance Enhancers	AURACEM 200																											
	AURACEM 300																											
	AURACEM 400																											
	AURACEM 670																											
	AURACEM 675																											
CEMAX Air Entrainers	CEMAX AE500																											
	CEMAX AE316																											
	CEMAX AE550																											
	CEMAX AE600																											
CEMAX Minerals Grinding Aids	CEMAX 360RM																											
	CEMAX 365RM																											
	CEMAX 380RM																											
	CEMAX 390RM																											
CEMAX Coal & Petcoke Grinding Aids	CEMAX 350CL																											

■ Primary influence
 ■ Secondary influence
 ■ Main application
 ■ Secondary Application

Fosroc offers a full range of construction chemical solutions, helping to protect structures throughout the world. Please refer to our brochures, which include:



Details of your local Fosroc office can be found at www.fosroc.com

Important Note

Fosroc products are guaranteed against defective materials and manufacture and are sold subject to its standard terms and conditions of sale, copies of which may be obtained on request. Whilst Fosroc endeavours to ensure that any advice, recommendation, specification or information it may give is accurate and correct, it cannot, because it has no direct or continuous control over where or how its products are applied, accept any liability either directly or indirectly arising from the use of its products, whether or not in accordance with any advice, specification, recommendation or information given by it.



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