



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

www.fosroc.com



constructive solutions

"The greatest constructions require solid foundations, the best being built on ROCK. Here is the foundation that supports FOSROC"

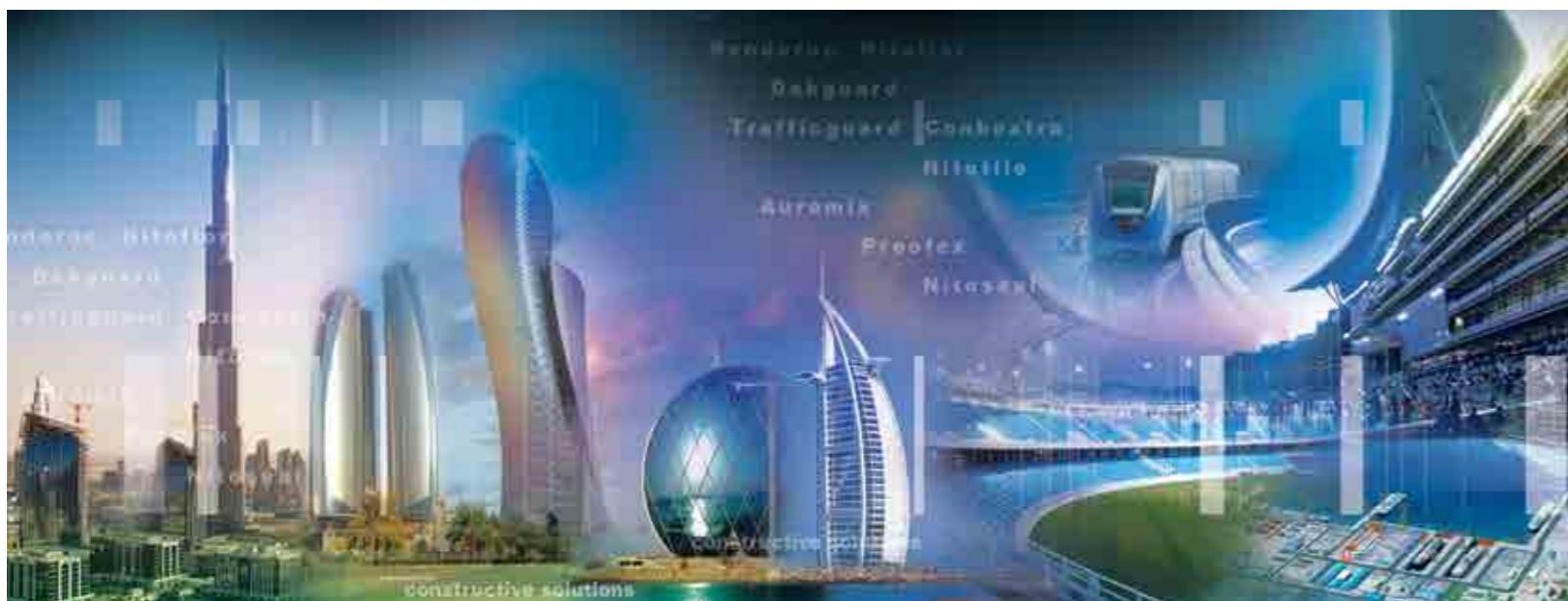
Dr. James Hay, Chairman – JMH Group

Our Profile

Fosroc commenced its Indian operations in 1981 and established a 100% subsidiary in 1999.

Fosroc has four state-of-the-art manufacturing facilities at Bengaluru, Karnataka; Ankleshwar, Gujarat; Kolkata, West Bengal and Keshwana, Rajasthan.

Fosroc Chemicals (India) Pvt. Ltd. works closely with its customers, including distribution and Applicator associates, through its well-equipped technical service department, a network of sales engineers, customer service professionals, Concrete technologist, Specification team etc. Fosroc India prides itself for the level of technical and customer support that it gives to its valued customers.



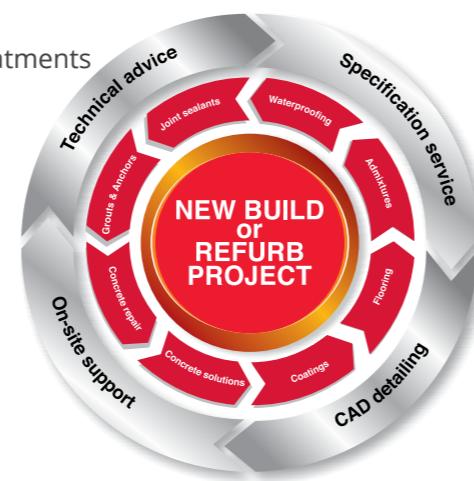
International leverage gives Fosroc the opportunity to offer tried and tested solutions from one geographical region to another with great confidence.

Fosroc Chemicals (India) Pvt. Ltd. provides time-tested solutions that include services such as:

- Diagnosis and Specification Support
- Application Support
- Distribution Support
- After-Sales Service
- Mix design support

- Admixtures and Surface Treatments
- Grouts and Anchors
- Industrial Flooring
- Concrete Repair
- Protective Coatings
- Joint Sealants and Adhesives
- Waterproofing
- Cement Additives

Fosroc Chemicals (India) Pvt. Ltd. remains focused on the Industry, Infrastructure and Building Segment with a wide range of quality products.



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.

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
- Attainment of desired Cement Quality
- Increased mill output
- Improved cement Pack Set Index (flowability)

Special Additives

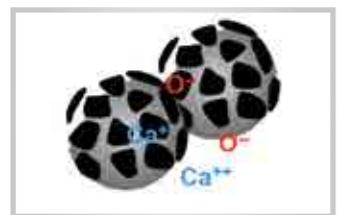
- Improved cement properties

CEMAX SOLUTION TO REDUCE AGGLOMERATION IN CEMENT GRINDING

Cemax Products

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

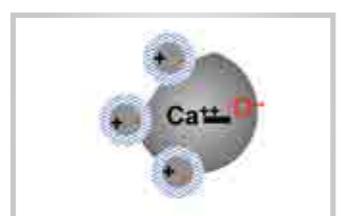
Mechanism of agglomeration



Cement particles agglomerate between each others due to static charges



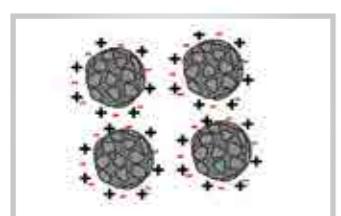
Re-agglomeration continues during grinding process



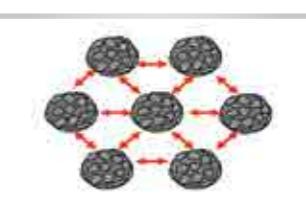
CEMAX a highly dipolar organic, adsorbs onto clinker



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



CEMAX neutralizes electrostatic charges on newly formed cement particle surface



Neutralized particles - reduce agglomeration between cement particles



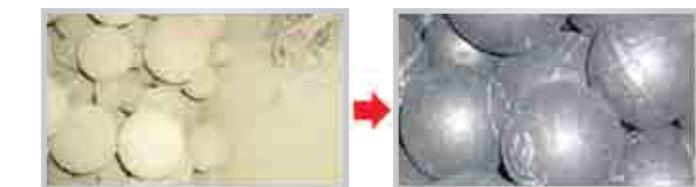
GRINDING AID ACTIONS

- 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 changes 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) neutralizes 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
- Improves Early Strength along with Productivity
- Improves Later Strength along with Productivity
- Reduces Setting Time
- Allows for usage of Chemical Gypsum"

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

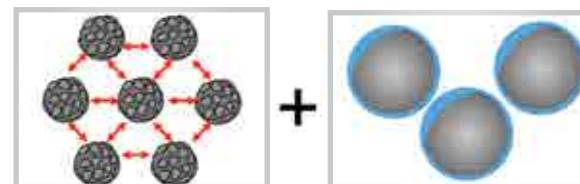
Introduction

- 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 neutralizes 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.

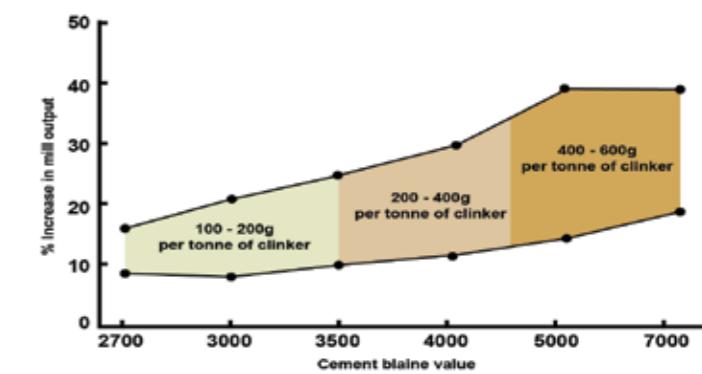


Benefits

- Improved cement quality by solving the following:
 - By aiding in utilization of low quality clinkers
 - Customizable products and solutions as per customer requirements
- Improved plant profitability by producing cement with lower clinker addition
- 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 consequently improving cement quality and thus allowing for higher clinker replacement

CEMAX - Performance Enhancer Advantages
The FUTURE is in sight...

CEMAX SPECIAL ADDITIVES

Benefits

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

CEMAX AE – Air Entraining Additives for Masonry Cement	Dosage 0.03%–0.08%	Increased Mill Output 8%–15%	Air Entraining 12%–25%	Recommended for Masonry Cement
CEMAX RM – Grinding Aids for Raw Mill	Dosage 0.04%–0.10%	Increased Mill Output 8%–20%	Recommended for Limestone Grinding at both Ball and Vertical Mills	*
CEMAX CL – Grinding Aids for Coal Mill for Coal/Petcoke grinding	Dosage 0.03%–0.10%	Mill Output Improvement upto 10%	Recommended for both Ball and Vertical Mills	Improved coal/petcoke fineness and Particle size distribution

* Grinding aids for raw material & coal/petcoke grinding are under Research & Development

LATEST PRODUCTS

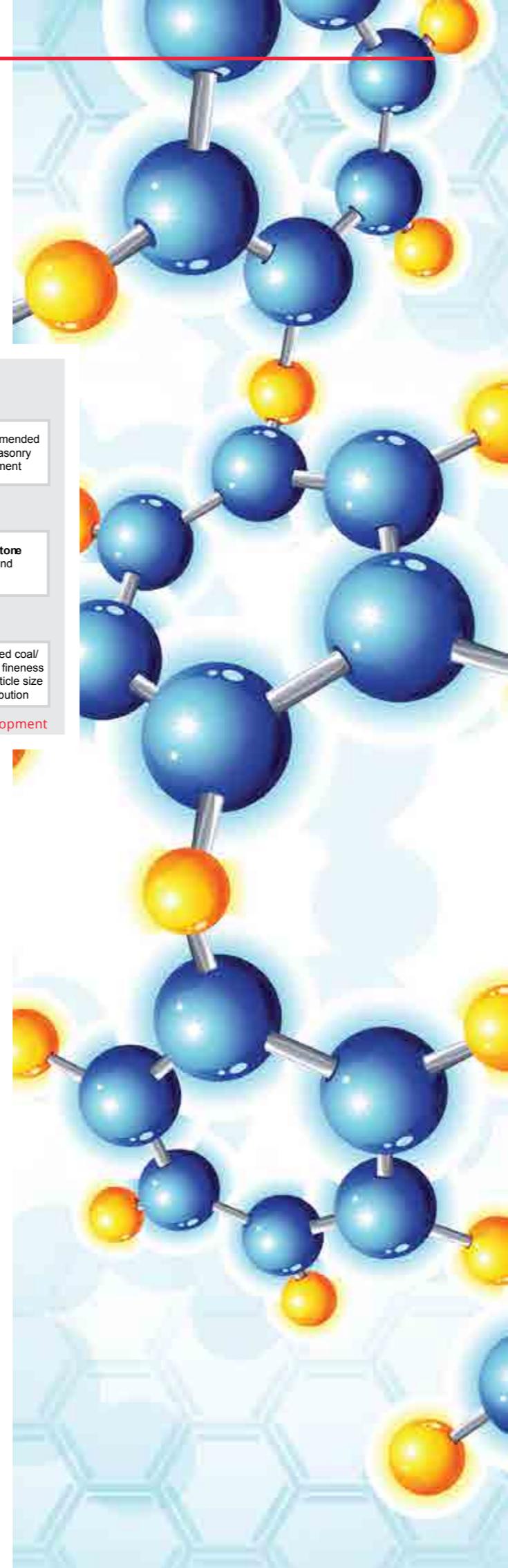


Higher Performance Grinding Aids

- 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	Impart water repellency	
CEMAX	CEMAX 102S											Ordinary Portland Cement
	CEMAX 135											Portland Pozzolana Cement
	CEMAX 235ES											Portland Fly Ash cement
	CEMAX 300G											Portland Slag Cement
	CEMAX 303											Masonry Cement
	CEMAX 303C											Limestone
	CEMAX 311S											Coal & Petcake
	CEMAX 315											Horizontal Ball Mill
	CEMAX 316											Vertical Roller Mill
	CEMAX 322											
	CEMAX 327											
	CEMAX 333											
	CEMAX 333L											
	CEMAX 334M											
	CEMAX 350											
	CEMAX 399											
	CEMAX 415											
	CEMAX 415E											
	CEMAX 415L											
	CEMAX 499											
	CEMAX 599											
	CEMAX 616E											
	CEMAX 625PC											
	CEMAX 673											
	CEMAX 675											
	CEMAX 691											
	CEMAX 697VN											
	CEMAX 699											
AURACEM	AURACEM 200											
	AURACEM 300											
	AURACEM 400											
	AURACEM 670											
	AURACEM 675											
CEMAX	CEMAX AE500											
	CEMAX AE316											
	CEMAX AE550											
	CEMAX AE600											
CEMAX	CEMAX 360RM											
	CEMAX 365RM											
	CEMAX 380RM											
	CEMAX 390RM											
CEMAX	CEMAX 350CL											

Primary influence

Secondary influence

Main Application

Secondary Application

* Products/Formulations are subject to changes and are customizable based on end-user requirement



- Head Office
- Plant
- ★ Regional Offices
- ▲ Branch Offices

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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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