Fosroc Grinding Aids and Performance Enhancers
CEMAX Technology
CONSTRUCTIVE SOLUTIONS

Fosroc delivers solutions, not just products

- We offer a total constructive solutions approach to each project, integrating products with knowledge, expertise, service and ongoing support
- Fosroc’s long history of experience and expertise combined with quality products and commitment to technology led innovation allows us to provide a customised and dedicated response to customers specific project needs
- Fosroc’s extensive product range also enables us to provide innovative solutions to complex and demanding structural challenges
CONSTRUCTIVE AND SUSTAINABLE SOLUTIONS TO CEMENT MANUFACTURERS

CEMAX TECHNOLOGY
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 benefit in terms of Flow, Compressive Strength and Consistency of finished product.

Cemax... Works as “GRINDING AIDS & PERFORMANCE ENHANCERS” 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 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

BENEFITS OF CEMAX TECHNOLOGY...
- Reduced agglomeration
- Improvements in: energy consumption, cement fineness and mill output
- Improved consistent quality of cements with Better flow characteristics
- Improved particle size distribution
- Increased strength
- Increased composites addition rate in the cement
- Improve setting time, especially incase of PPC and PSC
CEMAX GRINDING AIDS

CEMAX SOLUTION TO REDUCE AGGLOMERATION IN CEMENT GRINDING

Benefits
- 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 charges and reduce the surface energy forces

CEMAX neutralizes electrostatic charges on newly formed cement particle surfaces

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 surfaces
- It generates a very thin monomolecular film around the particles which soften some electrovalence bonds as well as neutralize electrostatic charges on the particle edges
- 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 grids
- 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 enhancer 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 Aid Advantages**

- CEMAX molecules adsorb onto newly formed cement particles, reduce agglomeration.
- Individually, CEMAX molecules enhance cement performance according to specific requirements.

**Performance Enhancer Actions:**
- Higher Early Strength and 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 (Improve cement dry flowability)
  - 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

![Graph showing benefits of CEMAX](image)
CEMAX SPECIAL ADDITIVES

Benefits

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

NEW PRODUCTS

- **CEMAX AE** - Air Entraining Additives for Masonry Cement
  - Dosage: 0.03%–0.10%
  - Improved Mill Output 12%–25%
  - Air Entraining Masonry Cement Recommended for

- **CEMAX RM** - Grinding Aids for Raw Mill
  - Dosage: 0.04%–0.10%
  - 8%–20% Increased Mill Output
  - Recommended for Limestone Grinding at both ball and vertical mills

- **CEMAX CL** - Grinding Aids for Coal/Petcoke grinding
  - Dosage: 0.03%–0.10%
  - Mill Output Improvement up to 10%
  - Recommended for both ball and vertical mills

High 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 cement
- Grinding Limestone cement
- Grinding hard clinkers
- Grinding hot clinkers
- Allow higher power reduction

High Performance Early and Late Strength Enhancers

- With AURACEM, cement early strength can be increased by up to 20%
- Allow higher addition of fillers such as Pozzolana, PFA and slag
- With AURACEM, 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

CEMAX – product range

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<th>Applications</th>
<th>Type of materials</th>
<th>Type of Mills</th>
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<td>Increase production</td>
<td>Ordinary portland cement</td>
<td>Cement ball mill</td>
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<tr>
<td>Reduce pack set</td>
<td>Portland Pozzolana cement</td>
<td>Cement vertical roller mill</td>
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<tr>
<td>Increase early strength of cement</td>
<td>Portland slag cement</td>
<td>Raw mix Ball mill</td>
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<td>Portland limestone cement</td>
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<td>Water retention</td>
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Additives types

- **Cemmax-Grinding aid and performance enhancer**
  - Cemmax 102
  - Cemmax 236 ES
  - Cemmax 300G
  - Cemmax 303
  - Cemmax 315
  - Cemmax 316
  - Cemmax 327
  - Cemmax 327 V
  - Cemmax 333
  - Cemmax 333 L
  - Cemmax 334 M
  - Cemmax 415
  - Cemmax 415 E
  - Cemmax 415 L

- **Auracem-Grinding aid and performance enhancer**
  - Auracem 205
  - Auracem 300
  - Auracem 400
  - Auracem 444

- **Special Additives**
  - **Air Entrainers**
    - Cemmax AE 500
    - Cemmax AE 600
  - **Raw mill Grinding Aids**
    - Cemmax 360 RM
    - Cemmax 375 RM
  - **Coal mill Grinding Aids**
    - Cemmax 350 CL

Primary influence | Secondary influence | Main influence
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.