

RheoFIT

for Manufactured Concrete Products



Admixture Systems Europe

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FIT 4 VALUE®

Environment

The Manufactured Concrete Products (MCP) industry produces everything from paving stones and blocks to roof tiles, pipes and hollow-core slabs. Appealing designs and surfaces, reduced construction times and low cost in use are key benefits of MCP products and are essential factors for the material choice of end users. As a result, MCP producers offer a wide variety of shapes, textures and colours at competitive prices.

Beside this variety, the MCP industry is characterised by the highest degree of automation among all concrete producers. From batching to form filling, compacting, curing and subsequent surface treatment, every process step is optimized.

This automation requires consistent mix properties independent of varying water contents and grading of the utilised raw materials. Green and early strength are critical parameters for the production process.

Aesthetics are important – although the European Standards mention that efflorescence does not harm the technical properties of MCP products, each manufacturer of architectural products has received claims due to efflorescence.

An economic manufacturing of long-lasting MCP products with appealing aesthetics leads to success in this very competitive environment. To support the MCP industry in its need for process optimization and enhancement of final product performances, BASF Construction Chemicals introduces:



Concept

The FIT 4 VALUE® concept addresses all process steps leading to high-quality products. FIT 4 VALUE considers the four elements essential for MCP manufacturers:

1. FIT for Economics
2. FIT for Performance
3. FIT for Aesthetics
4. FIT for Durability

Here, FIT means meeting every requirement for economics, performance, aesthetics and durability.

FIT 4 VALUE supports the MCP industry's goal of process optimization. It considers the entire production operation, addressing all process steps to provide the superior performance of final products.

This concept is suitable for all Manufactured Concrete Products made of earth-dry concrete such as pavers, blocks, pipes (instantly demoulded), roof tiles and hollow core slabs.

The key elements of FIT 4 VALUE are RheoFIT® products, each engineered for a different specific need of MCP manufacturers.

The FIT 4 VALUE concept is an innovation for the MCP industry typical of BASF Construction Chemicals' drive for technological development and its desire to work in partnership with MCP manufacturers – in short, we add value to concrete.



Benefits of FIT 4 VALUE

FIT for Economics

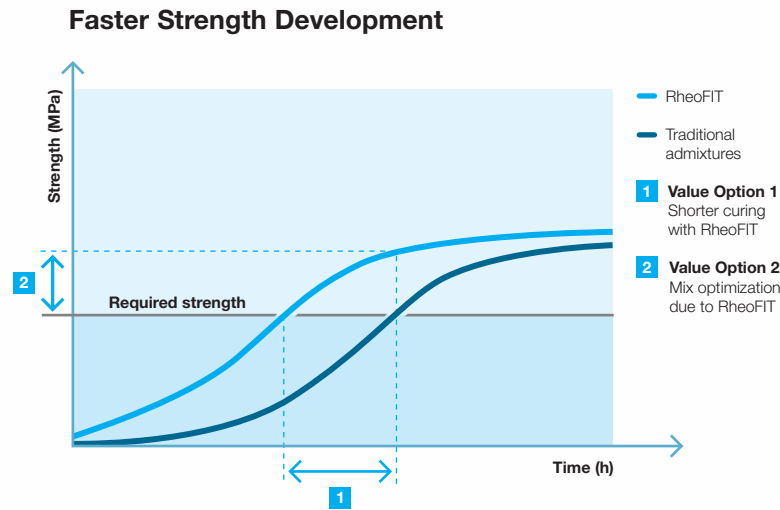
An economical production considers concrete mix design, production process, labour and material safety as well as logistics.

Thanks to its unique principle of acting on the cement grain, RheoFIT fully exploits the hydration potential of cement resulting in higher early strengths and shorter curing times.

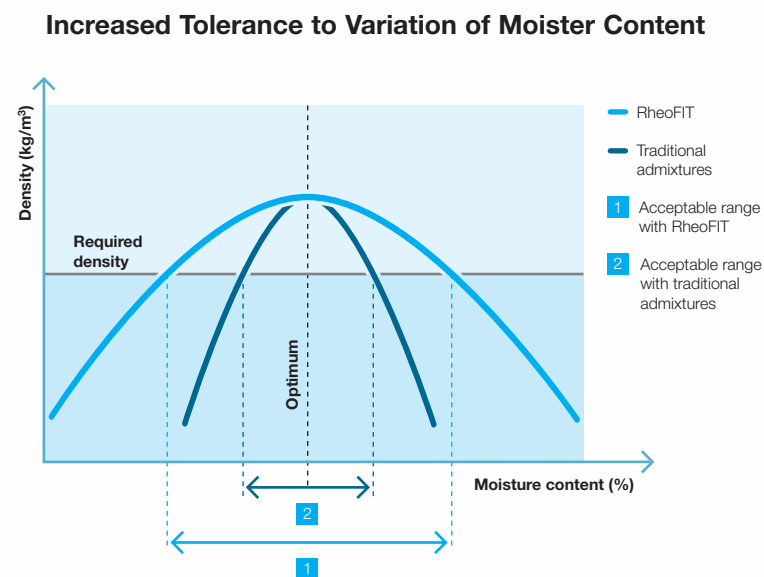
Varying moisture contents of the delivered sand or accumulation of water at the bottom of storage bins may lead to insufficient green strengths and upset the fine balance between the mix and machine. The specially engineered molecules of RheoFIT enhance substantially the tolerance to variation of water content in the concrete mix, leading to a safer production and less wastage.

The multipurpose properties of RheoFIT minimise the number of admixture products needed, reducing the complexity of the mix.

Consequently, FIT 4 VALUE and RheoFIT enable lower cost per MCP unit produced.



Result:
Higher curing capacity due to shorter curing times or optimization of concrete mix



Result:
High quality without adaptation of manufacturing equipment

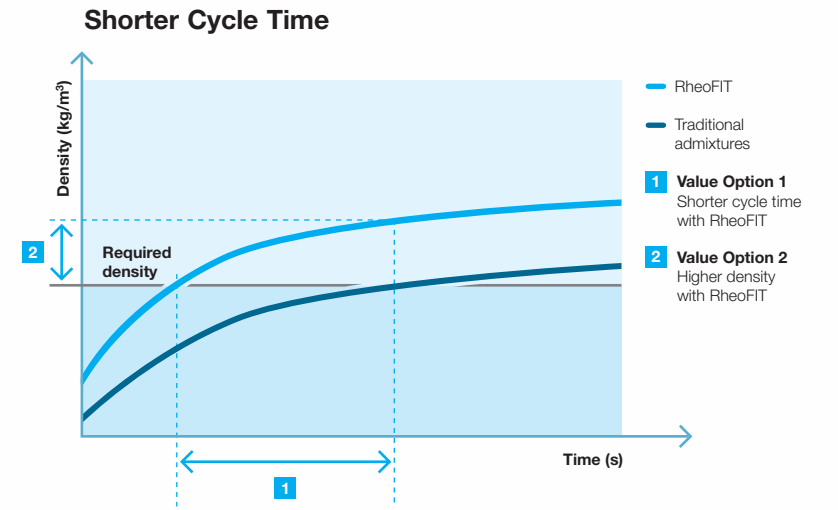
FIT for Performance

The productivity in the MCP industry is linked directly to the performance of the manufacturing equipment regardless of whether pavers, blocks, pipes, tiles or hollow-core slabs are produced.

The performance of MCP manufacturing equipment can be measured by its cycle time (form filling, compaction and stripping) or in the case of hollow-core slabs by its production speed. The shorter the cycle time, the higher the production output.

RheoFIT's unique molecule design reduces the cycle time in two ways: The internal friction of the mix is minimised leading to a better fillability and initial compaction. The compaction energy is reduced resulting in shorter vibration times.

RheoFIT enhances the placing and compaction characteristics of the concrete mix and consequently the production output whilst the quality of finished product is maintained or even enhanced.



Result:
Easier form filling and enhanced compactability leads to shorter cycle time or higher density



Benefits of FIT 4 VALUE

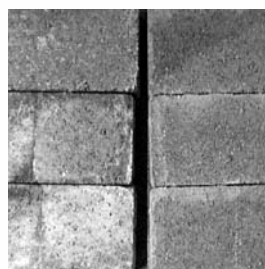
FIT for Aesthetics

Outstanding aesthetics go beyond design – they are the main differentiation criteria for MCP manufacturers. Properties such as water and dirt repellency, uniform colours, closed and efflorescence-free surfaces are increasingly demanded by the end user of MCP products.

The comprehensive range of RheoFIT products, specifically developed to provide a unique performance, allow the required properties to be added individually to MCP products, even eliminating efflorescence.

Formation of efflorescence on the concrete's surface is a major reason for complaints in the MCP industry. This crystalline deposit of calcium carbonate precipitates from the reaction of the calcium hydroxide with carbon dioxide. Calcium hydroxide is formed by the hydration of cement, is soluble in water and migrates over time to the surface of concrete.

The unique and proprietary technology-based RheoFIT inhibits or even completely eliminates efflorescence by stabilising on a nanolevel the salts responsible for the undesired phenomenon, thus avoiding their deposition on the surface.



FIT for Durability

A key benefit of MCP products beside their appealing aesthetics is their durability. Without maintenance work, high-quality MCP products are long-lasting and retain their design properties.

EN Standards such as EN1338 for pavers ensure durability with their classification system and specific requirements regarding water absorption, resistance to freeze-thaw, abrasion resistance and strength properties.

The wide range of RheoFIT products supports the MCP industry in meeting these requirements and producing economical, long-lasting products.

Our Customer Approach

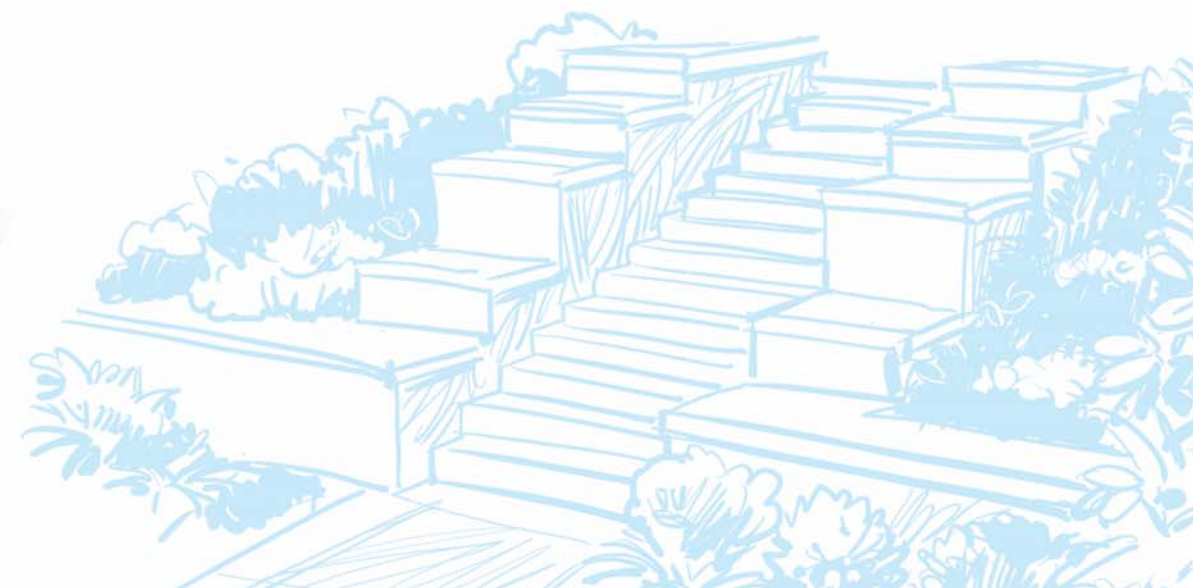
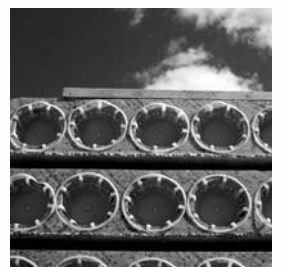
Production Efficiency Method

An integral part of the FIT 4 VALUE concept is BASF Construction Chemicals' specific customer approach.

Our sales force visits MCP plants, analyses and defines in cooperation with the manufacturer the potentials for process optimization as well as the enhancement of the finished MCP products. Based on the findings of this analysis, the requirements for admixture products relating to economics, performance, aesthetics and durability are defined.

For testing admixtures in specific concrete mixes for economics and performance, BASF Construction Chemicals has developed its exclusive Production Efficiency Method. Utilising a sophisticated testing device that simulates the production process in the MCP industry, BASF Construction Chemicals receives indications about mix properties such as fillability, compactability and optimal water content. The Production Efficiency Method uses computer-assisted technology to compact the sample using a shear-compaction principle combining pressure and shear movement.

The combination of this evaluation method with our experience enables BASF Construction Chemicals to offer the most advantageous admixture product for concrete mix optimization. In subsequent field tests, product performances are proven under real conditions.

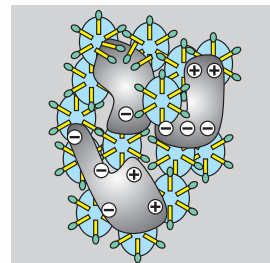
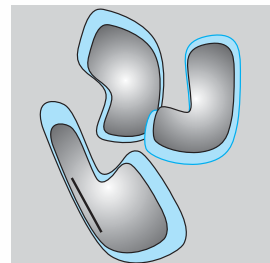
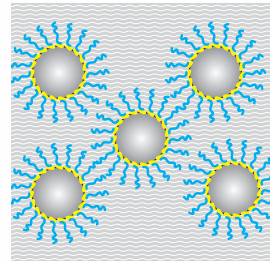


Mechanism of Action

The RheoFIT products are especially engineered for the specific needs of MCP manufacturers. The R&D centres of BASF Construction Chemicals applied their advanced know-how in nanotechnology to develop new innovative molecules and formulations. RheoFIT products consider the different chemical and physical reaction in earth-dry concrete mixes and the complex interaction with a machine intensive environment.

The RheoFIT mechanism of action is essentially based on:

- Optimal dispersion of cement/pigment particles thanks to electrostatic and steric repulsion. Thus, the exploitation of full hydration potential and the development required strength at optimized w/c ratio is achieved. In addition a uniform and appealing vibrancy of colours enhances the aesthetics of final products.
- Effective tribological, lubricating action thanks to minimized friction between concrete elements. The ability of concrete filling, placing is facilitated and consequently also the compaction. The more compact pore structure and concrete density influences strength development, water permeability and surface finish.
- Chemical stabilization of hydration products to prevent from capillary raise. The undesired efflorescence phenomenon and concrete permeability are controlled.



Our RheoFIT Products

The key element of the FIT 4 VALUE concept is the comprehensive RheoFIT product range which satisfies virtually all needs of MCP manufacturers.

- RheoFIT optimizes the mix design, enhances tolerance to mixing water and consequently brings economic benefits.
- RheoFIT reduces the cycle time thus enhancing performance.
- RheoFIT controls efflorescence, and enhances colour vibrancy and uniformity for outstanding aesthetics.
- RheoFIT products provide water repellency and improve strength as well as freeze/thaw and abrasion resistance, giving improved durability.

FIT for Economics

- Optimized mix design (cement reduction/replacement)
- Reduced curing time
- Higher tolerance to change in moisture content
- Less maintenance
- Less product rejections

FIT for Performance

- Reduced cycle time/faster production
- Better fillability
- Enhanced compactability
- Improved extrudability
- Less wear & tear of production machine/equipment
- Smooth, easy instant demoulding
- Increased resistance to deformation

Auxiliaries

The RheoFIT product range is completed with dedicated auxiliaries assisting the MCP industry throughout it's very high grade of automation by

- protecting production equipment and tools, e.g. palettes
- facilitating a quick and damage free demoulding
- assuring an efficient and effective cleaning of process components
- providing improved surface finish

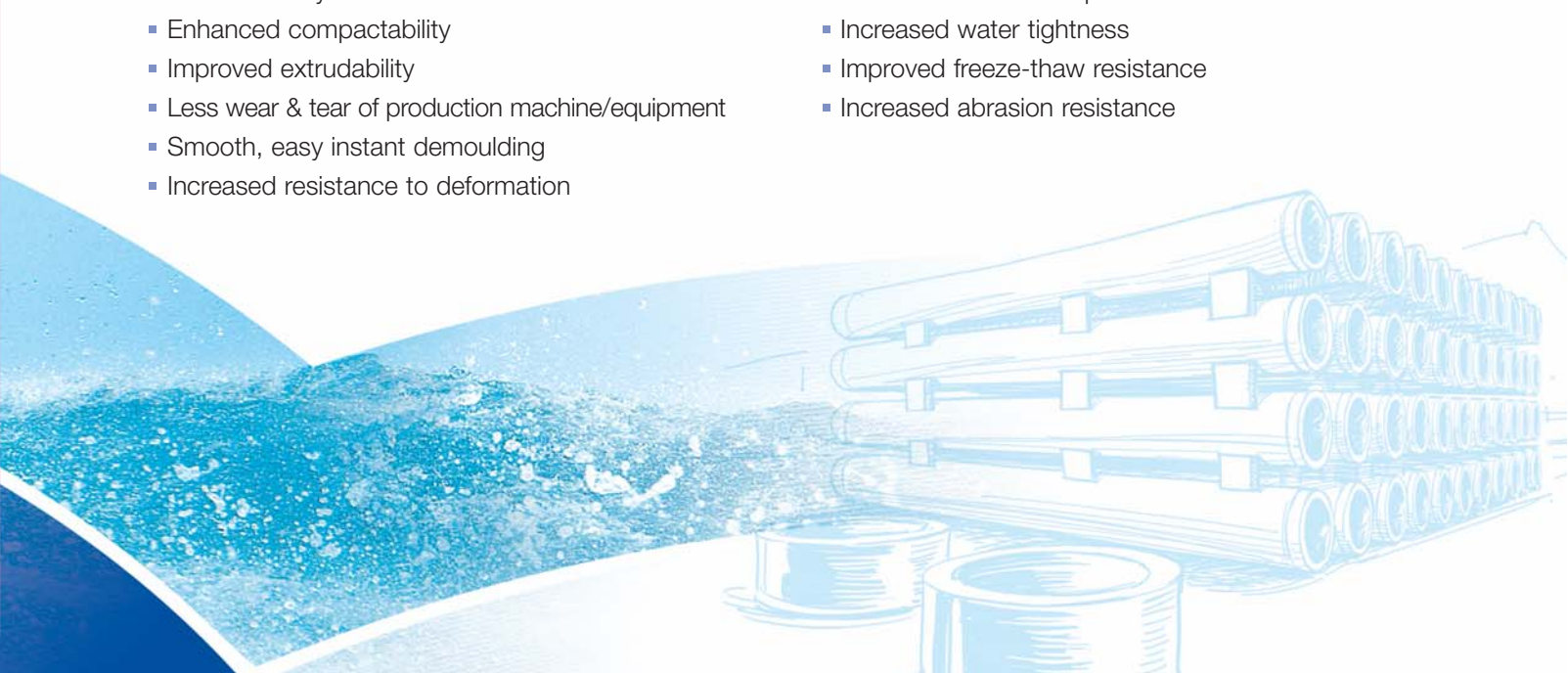
The Rheofinish® range of auxiliaries, both water and solvent based, provides: clean production, safe and instant demoulding, excellent finishes and economic use. Especially the environmental friendly aqueous emulsions obtain increased importance.

FIT for Aesthetics

- Efflorescence control
- Closed surfaces
- Sharp edges
- Appealing surface appearance
- Enhanced colour uniformity/vibrancy
- Dirt repellence

FIT for Durability

- Improved strengths (green, early, final)
- Reduced water absorption
- Increased water tightness
- Improved freeze-thaw resistance
- Increased abrasion resistance



Adding Value to Concrete

Deliverables of the Global Leader

As part of the world's largest chemical company, BASF Construction Chemicals is the market leader in the admixtures business. We are committed to engineering quality solutions to drive the concrete industry forward. Through constant research and development into new products, systems, application methods and equipment, we add value to concrete. Our market-segmented structure means that you can rely on the proximity of a regional company with the backing of a global group.

▪ **Innovative Products**

Comprehensive range of admixtures specially engineered for the needs of ready-mix producers, precast operators, contractors and manufactured concrete products producers

▪ **Single Source**

Complete range of latest technology admixtures for concrete and mortar as well as auxiliary products such as form release agents, curing compounds and surface retarders

▪ **Superior Logistics**

Easy communication and proficient means of transportation ensured by local organization

▪ **Knowledge and Experience**

Superior expertise in concrete and mortar technology, its application and design with full local coverage

▪ **Value-Added Service**

Specification development, mix design and production process optimization support and quality control

▪ **Expert Training**

Specific programmes for producers and contractors

