



# Manufactured Concrete Products

Advanced Admixture Solutions





# Master Builders Solutions from BASF

## Master Builders Solutions

The Master Builders Solutions brand brings all of BASF's expertise together to create chemical solutions for new construction, maintenance, repair and renovation of structures. Master Builders Solutions is built on the experience gained from more than a century in the construction industry.



The know-how and experience of a global community of BASF construction experts form the core of Master Builders Solutions. We combine the right elements from our portfolio to solve your specific construction challenges. We collaborate across areas of expertise and regions and draw on the experience gained from countless construction projects worldwide.

We leverage global BASF technologies, as well as our in-depth knowledge of local building needs, to develop innovations that help make you more successful and drive sustainable construction.

The comprehensive portfolio under the Master Builders Solutions brand encompasses concrete admixtures, cement additives, chemical solutions for underground construction, waterproofing solutions, sealants, concrete repair & protection solutions, performance grouts, performance flooring and tiling solutions.





## Environment

**Manufactured Concrete Products:** satisfying every type of demand with attractive designs, reduced construction times and low expenses.

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

Beside this variety, the MCP industry is characterized 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 raw materials utilized. Green and early strength factors are critical parameters for the production process. Aesthetics are important – although European Standards mention that efflorescence does not harm the technical properties of MCP, each manufacturer of architectural products has received requests to reduce or avoid efflorescence. Economical manufacturing of long-lasting MCP with appealing aesthetics leads to success in this very competitive environment. We at Master Builders Solutions support the MCP industry in its need for process optimization and the enhancement of final product performances, thus introducing:





## The 4 Values Concept

**Master Builders Solutions and MCP manufacturers:** staying connected and working in partnership towards technological progress.

The 4 Values concept addresses all process steps leading to high-quality by considering the four elements essential for MCP manufacturers:

1. **Economics**
2. **Performance**
3. **Aesthetics**
4. **Durability**

The 4 Values concept supports the MCP industry's goal of process optimization. It considers the entire production operation, addressing all process steps to enable the superior performance of end products.

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

The key elements of the 4 Values concept are MasterCast®, Master X-Seed® and MasterLife®, each engineered by our experts to meet a different specific need of MCP manufacturers. The 4 Values concept is an innovation for the MCP industry, in line with the Master Builders Solutions experts' drive for technological development and our desire to work in partnership with MCP manufacturers: we stay connected.

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# Benefits of the 4 Values Concept

## Economics

Economical production considers concrete mix design, production process, labor and material safety as well as logistics.

The process efficiency 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.

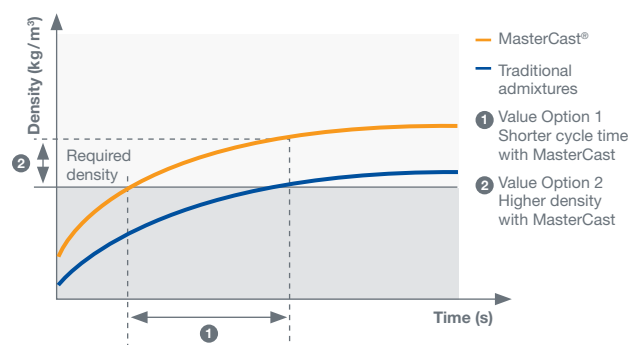
MasterCast's unique molecule design reduces the cycle time in two ways: the internal friction of the mix is minimized, leading to better fillability and improved compactability. The compaction energy required is reduced, resulting in shorter vibration times.

## Reducing cycle time

MasterCast's unique molecule design tackles this problem by reducing the cycle time in two ways: optimal dispersion of cement/pigment particles thanks to electrostatic and steric repulsion. Thus, the exploitation of full hydration potential and the development of the required strength at an optimized w/c ratio is achieved. A uniform and appealing vibrancy of colors enhances the aesthetics of the final products. In addition, there is an effective tribological, lubricating action thanks to minimized friction among the solid particles of cement and aggregates in the concrete mix.

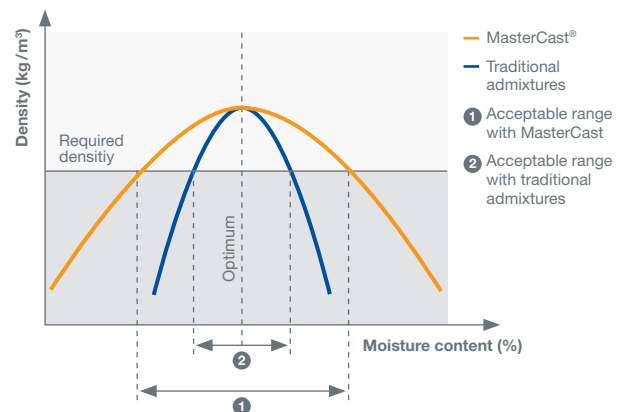
Successful concrete filling/placing, and consequently compaction, are facilitated. The more compact pore structure and concrete density influence strength development, water permeability and surface finish. MasterCast enhances the placing and compaction characteristics of the concrete. Varying moisture contents of the delivered sand or an accumulation of water at the bottom of storage bins may lead to insufficient green strengths and upset the fine balance between mix and machine. The molecules of MasterCast have been specially engineered to substantially

## Shorter cycle time



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

## Increased tolerance to variation of moisture content



**Result:**  
High quality without adaption of manufacturing equipment

enhance tolerance to the variation of water content in the concrete mix, thus leading to safer production and less wastage. The multipurpose properties of MasterCast minimize the number of admixture products needed, reducing the complexity of the mix. Consequently, the 4 Values concept and MasterCast enable lower cost per MCP unit produced.

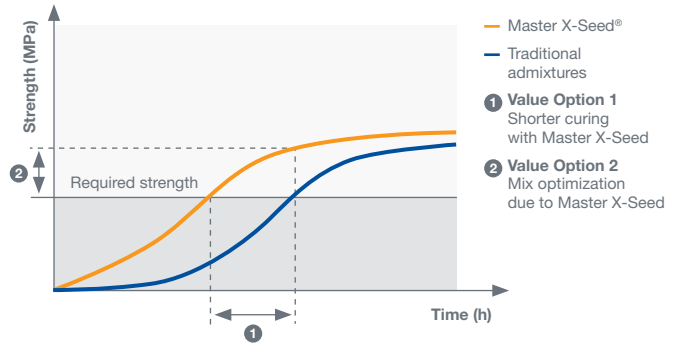
**Performance**

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

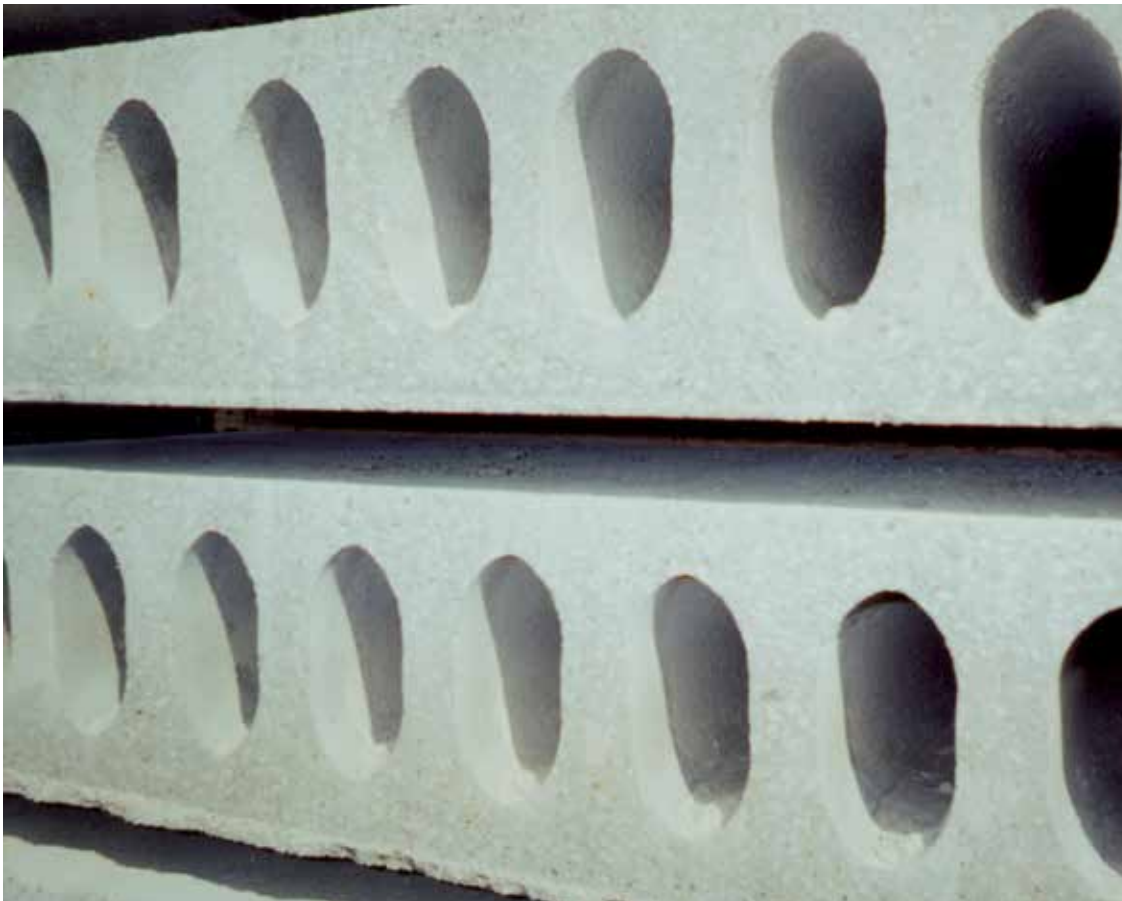
The Crystal Speed Hardening concept enables more sustainable concrete production thanks to the unique technology of our new Master X-Seed® hardening accelerator. A previously unattainable hardening boost at all temperature levels is achieved in the early ages (6–12 hrs) due to the powerful seeding of CSH crystals in the concrete mass, which is also able to support the final performance of the specified concrete.

With this, we help the concrete industry achieve better process economy, higher concrete quality and increased energy efficiency in order to save time and money and reduce CO<sub>2</sub> emissions.

**Faster strength development**



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



### Aesthetics

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

### MasterCast®

The comprehensive range of our MasterCast® products, specifically developed to provide unique performance, allow the required properties to be added individually to MCP, thus meeting every need.

### Efflorescence

The formation of efflorescence on the concrete's surface is a major reason for complaints in the MCP industry. This crystalline deposit of calcium carbonate forms through the reaction of calcium hydroxide with carbon dioxide. Calcium hydroxide is formed by the hydration of cement, is soluble in water and migrates over time to the concrete's surface, where it can react with the CO<sub>2</sub> in the air. The unique and proprietary technology-based MasterCast® WP 793 inhibits or even completely eliminates efflorescence by stabilizing on a nanolevel the salts responsible for the undesired phenomenon, thus avoiding their appearance on the surface. MasterCast WP 793 mechanism of action is essentially based on the chemical stabilization of hydration products to prevent capillary rise. Our product helps to control the undesired efflorescence phenomenon and concrete's permeability.

### Durability

A key benefit of MCPs beside their appealing aesthetics is their durability. Without maintenance work, high-quality MCPs are long-lasting and retain their design properties. EN Standards ensure durability through their classification system and specific requirements.

Our wide range of MasterCast® products supports the MCP industry in meeting these requirements. In addition, MasterLife® provides special performance in respect of durability. MasterLife's patented state-of-the-art corrosion-inhibiting admixture is formulated to inhibit the corrosion of steel-reinforced concrete. MasterLife provides two levels of corrosion protection, thus making it the most effective corrosion-inhibiting admixture available.

MasterLife provides the following durability benefits:

- Extended service life of reinforced concrete structures.
- Premium corrosion protection by slowing the ingress of chlorides and moisture into the concrete and forming a strong, durable protective film on the reinforcing steel.
- Effective in cracked concrete where the aggressive agents that cause corrosion have direct access to the reinforcing steel.
- Increased sulphate resistance.
- Normal set product that is easily used in elevated temperatures.







## Our Customer Approach

### Production efficiency method

We at Master Builders Solutions have a specific customer approach; this is an integral part of the 4 Values concept. Our sales force visits MCP plants, and analyzes and defines in cooperation with the manufacturer the potential for solutions in process optimization as well as in enhancement of the finished MCP. Based on the findings of this analysis, the requirements for admixture solutions relating to economics, performance, aesthetics and durability are defined.

To test these solutions in specific concrete mixes for economics and performance, we have developed our exclusive Production Efficiency Method. Utilizing a sophisticated testing device that simulates the production process in the MCP industry, the Master Builders Solutions experts assess 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 our specialists to offer the most advantageous solution for concrete mix optimization.

MasterCast®, Master X-Seed® and MasterLife® products are especially engineered for the specific needs of MCP manufacturers. Our Master Builders Solutions R&D centers applied their advanced know-how in nanotechnology to develop new innovative molecules and formulations. MasterCast, Master X-Seed and MasterLife products are engineered to consider the different chemical and physical reactions in earth-moist concrete mixes and their complex interaction with a machine-intensive environment.





## Auxiliaries – Extending our 4 Values Concept

When it comes to securing equipment, fast demoulding or successful cleaning: our committed auxiliaries help the MCP industry in every aspect of the operational process.

Our product range under the 4 Values concept is completed by dedicated auxiliaries assisting the MCP industry throughout its extremely high degree of automation by protecting production equipment and tools, e.g. pallets, facilitating quick and damage-free demoulding, ensuring the efficient and effective cleaning of process

components and providing an improved surface finish. Our MasterFinish® range of auxiliaries, both water and solvent based, provides: clean production, safe and instant demoulding, excellent finishes and economical use. Our environmentally friendly aqueous emulsions are becoming increasingly important, in particular.







# Master Builders Solutions from BASF for the Construction Industry

## **MasterAir®**

Complete solutions for air entrained concrete

## **MasterBrace®**

Solutions for concrete strengthening

## **MasterCast®**

Solutions for the manufactured concrete product industry

## **MasterCem®**

Solutions for cement manufacture

## **MasterEase®**

Solutions for reducing concrete viscosity

## **MasterEmaco®**

Solutions for concrete repair

## **MasterFinish®**

Solutions for formwork treatment

## **MasterFlow®**

Solutions for precision grouting

## **MasterFiber®**

Comprehensive solutions for fiber reinforced concrete

## **MasterGlenium®**

Solutions for hyperplasticized concrete

## **MasterInject®**

Solutions for concrete injection

## **MasterKure®**

Solutions for concrete curing

## **MasterLife®**

Solutions for enhanced durability

## **MasterMatrix®**

Advanced rheology control solutions for self-consolidating concrete

## **MasterPel®**

Solutions for water tight concrete

## **MasterPolyheed®**

Solutions for mid-range concrete

## **MasterPozzolith®**

Solutions for water-reduced concrete

## **MasterProtect®**

Solutions for concrete protection

## **MasterRheobuild®**

Solutions for high strength concrete

## **MasterRoc®**

Solutions for underground construction

## **MasterSeal®**

Solutions for waterproofing and sealing

## **MasterSet®**

Solutions for set control

## **MasterSure®**

Solutions for extraordinary workability retention

## **MasterTile®**

Solutions for tiling systems

## **MasterTop®**

Solutions for industrial and commercial floors

## **Master X-Seed®**

Advanced accelerator solutions for concrete

## **Ucrete®**

Flooring solutions for harsh environments

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