



**Mapecrete[®]
System**

Mapecrete System

Mapecrete System is a proven technology by MAPEI for producing shrinkage-compensated concrete, where a high degree of dimensional stability is required to prevent shrinkage cracks in structures.

Mapecrete System is based on the principle that shrinkage may be restrained by a structural reinforcement system. MAPEI has a complete range of products able to control the chemical and physical processes within concrete over time. By selecting the right quantity of suitable admixtures, the amount of shrinkage in concrete may be calculated and, therefore, controlled.

Mapecrete System is applied by combining a blend of three admixtures within the concrete: A mid-range water reducer specifically developed for slabs, a shrinkage-compensating agent and a shrinkage-reducing agent. The effect of this system is guaranteed by the synergistic effect of the three products combined with the use of a synthetic fiber.

Areas of use

There are no particular drawbacks with *Mapecrete System*, and it may be used for any type of structure. The system, which guarantees a reduction in the level of shrinkage cracks, reduces the amount of weak points in the concrete and increases its durability, thereby extending the service life of the structure. *Mapecrete System* has been successfully used in various construction projects, including in areas with structural requirements. These are some of the most common areas of use:

- Industrial floors
- Multi-story parking garage
- Precast concrete members

- Floor joists and piles for industrial bridges
- Floor slabs for bridges
- Hydraulic structures

With industrial floors, where cracks caused by hydraulic shrinkage are one of the main causes of deterioration, this phenomenon is controlled by inserting joints in appropriate positions.

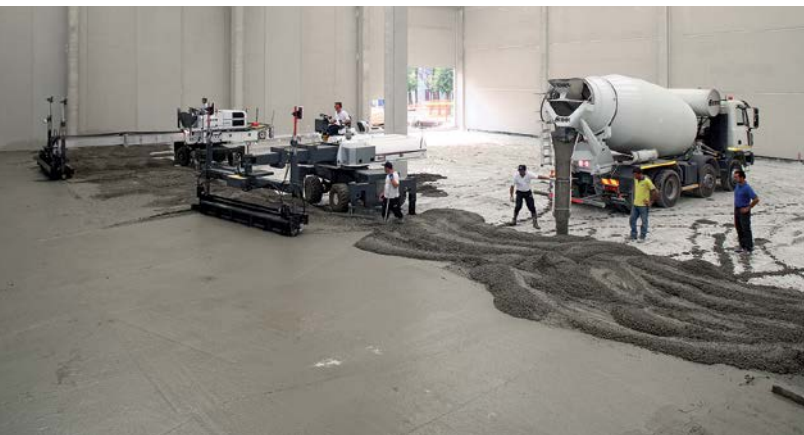
Mapecrete System allows the number of contraction joints to be reduced and, in certain cases, to be completely eliminated.

Mapecrete technology is also successfully used for floor slabs on bridges. With this particular type of application, because the structure will always be exposed to temperature variations wherever they are located, expansion joints are always required.

Mapecrete System is also often used for repair work on bridge piles, where it is important that the variation in volume of the support concrete is the same as that of the concrete used to carry out the repair work.

Mix design

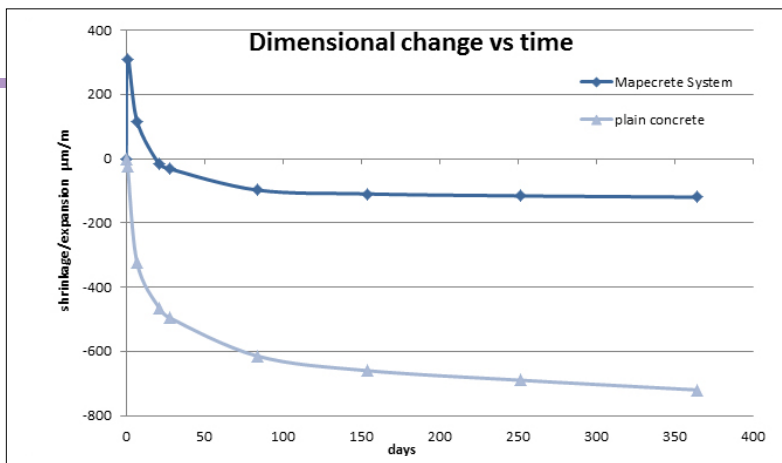
The mix design of concrete is extremely important in order to correctly use *Mapecrete System* and have good results. The factors that need to be taken into consideration for any mix design are maximum water content, the type and amount of cement used, the water/cement ratio and the type of aggregate used. These elements must never be overlooked when designing a concrete mix with the three components of *Mapecrete System*, which are detailed on the next page.



Concrete flooring



Self-compacting concrete



Water reducer

Dynamon System is a range of modified acrylic-based admixtures made by MAPEI. *Dynamon* System allows the amount of mixing water to be considerably reduced and extends workability, depending on each site's particular requirements. Within this product group, *Dynamon SX* or *Dynamon SX 37* can be utilized as ASTM C494 Type A or Type F water reducers.

Shrinkage-reducing agent

Mapecrete SRA 27 is a liquid admixture supplied by MAPEI that is used to reduce drying shrinkage. Laboratory tests have demonstrated that using SRA admixtures reduces drying shrinkage after 28 days up to 50%.

Mapecrete System uses the synergic effect of the three single components to increase expansion during the first phase and reduce the effect of shrinkage during the second phase, when the level of relative humidity is that of the surrounding environment.

The chart illustrates the dimensional change measured in the laboratory on concrete specimens of a reference mix, and then on the same mix incorporating *Mapecrete* System.

One of the conditions for *Mapecrete* System to work effectively is that the concrete must always be strengthened using synthetic fibers, such as with *Mapefibre ST 42* or *Mapefibre ST 50 Twisted*, or with a single or double layer of metallic strengthening mesh – so that the minimum percentage, in terms of ratio between section of rebars and section of concrete, cannot be lower than 0.15%. The expansion induced by the admixtures is restrained by the reinforcement to generate a sort of pre-stressed condition that gradually decreases as drying shrinkage advances. The reduction in the level of internal tensile stresses eliminates the risk of cracking.

Expansive agent

The remaining drying shrinkage is offset by *Expancrete*, a powder admixture slowly reacting with the concrete mixing water to ensure the overall volumetric stability.

Compatibility with other systems

The curing of concrete containing *Mapecrete* System must be always performed and preferably extended to 10 to 14 days after the concrete is poured. Correct curing of concrete is crucial to ensure maximum performance of *Mapecrete* System.

MAPEI recommends the use of *Mapecrete Film* at the concrete surface to prevent water evaporation and ensure constant availability of water to maximize the cement hydration.



Edge beam



Slab on viaduct



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