

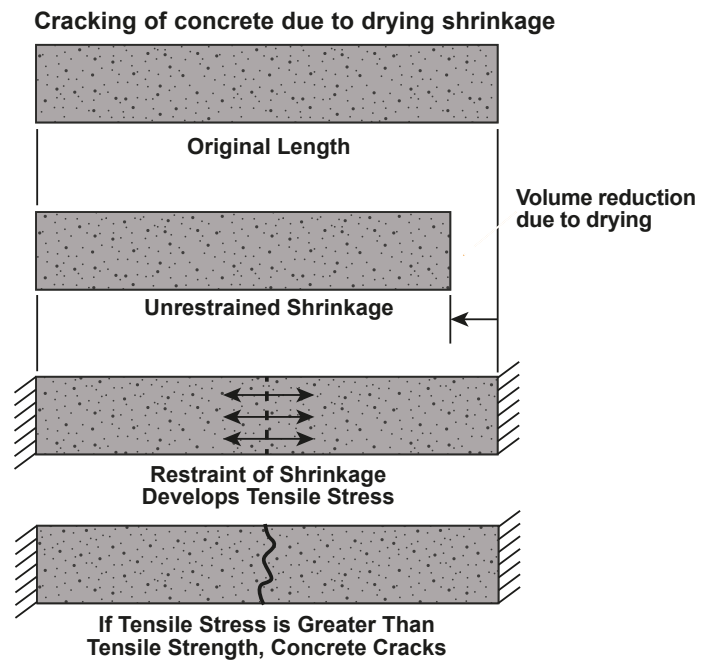


## Technical Bulletin

### Shrinkage and Crack-Reducing Admixture Technologies

#### Drying Shrinkage Cracking

The loss of moisture from concrete after it hardens, and hence drying shrinkage, is a phenomenon that routinely occurs and deserves careful consideration in the design and construction of concrete structures. The loss of moisture is accompanied by a reduction in concrete volume and cracking will occur if restraint to the volume change leads to induced tensile stresses that exceed the tensile strength of the concrete. Cracking results in poor aesthetics and can affect the serviceability or durability of a concrete structure.



## Shrinkage Specifications

Limits on 28-day drying shrinkage are sometimes included in project specifications for a variety of reasons, but primarily to reduce the potential for cracking. The 28-day drying shrinkage limits can range from 0.040 percent down to 0.020 percent, which is extremely low, but 0.035 percent is typical. Structure types include bridge decks, liquid containment structures, parking structures and, increasingly, slabs-on-ground.

### Typical Drying Shrinkage Limits

- Most Structural Concrete Specifications – 0.035 %
- Pavements – 0.05 %
- High Volume Fly Ash Concrete – 0.055 %
- Bridge Decks – 0.04 % - 0.035 %

## Minimize Drying Shrinkage

Several basic steps can be taken during mixture proportioning to lower the drying shrinkage of a concrete mixture, such as lowering total mix water content and increasing coarse aggregate top size. If a further reduction in drying shrinkage is required, the following Master Builders Solutions shrinkage- and crack-reducing admixture technologies can be used. Details of these and other measures can be found in Master Builders Solutions' *Concrete Technology in Focus: Shrinkage of Concrete* publication.

**MasterLife® SRA 035 shrinkage-reducing admixture** - an admixture that reduces drying shrinkage and minimizes the cracking potential of concrete or mortar.

**MasterLife CRA 007 crack-reducing admixture** - a special class of shrinkage-reducing admixture that produces a maximum initial

crack width of 175 µm in high-performance, crack-prone concrete mixtures tested in accordance with ASTM C 1581/C 1581M, "Standard Test Method for Determining Age at Cracking and Induced Tensile Stress Characteristics of Mortar and Concrete Under Restrained Shrinkage."

## Crack-Reducing Admixture Technology

MasterLife CRA 007 crack-reducing admixture is a one-of-a-kind liquid admixture that, compared to conventional shrinkage-reducing admixtures, provides enhanced performance by significantly reducing the initial width of cracks, should cracking occur.

### Quick Tip

Concrete mixtures should be designed to meet project specifications. If a specific concrete mixture has historically good performance, consider selecting that design for a successful project. Absent any prescriptive project specifications, a total water content of 260 lb/yd<sup>3</sup> (154 kg/m<sup>3</sup>) is a good starting point for good workability and low drying shrinkage. The use of MasterLife SRA 035 admixture or MasterLife CRA 007 admixture will further enhance the performance of the concrete mixture. *A field trial is strongly recommended to verify that the desired performance can be achieved.*

### Important Notes

The use of a shrinkage- or crack-reducing admixture is neither a cure for all concrete cracking nor a substitute for poorly designed concrete mixtures.

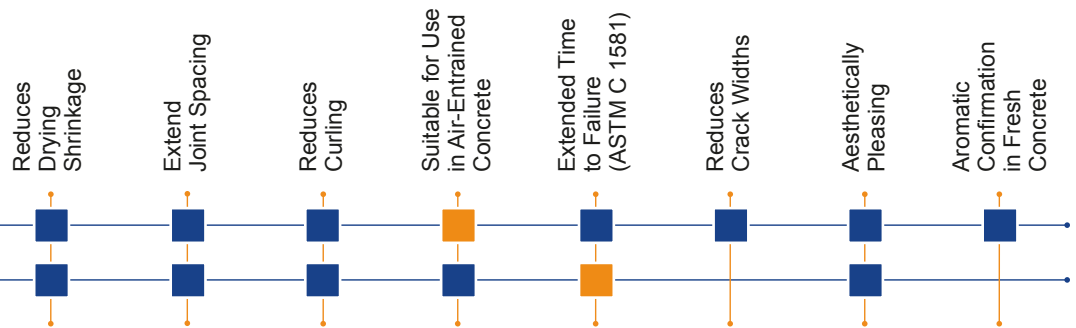
These admixtures are designed to be used in good quality, properly proportioned concrete mixtures that are placed, finished and cured in accordance with ACI guidelines.

## Features and Benefits of Master Builders Solutions Shrinkage and Crack-Reducing Admixtures

### Technology

MasterLife CRA 007 Admixture

MasterLife SRA 035 Admixture



Good Better

### Master Builders Solutions Admixtures US, LLC

23700 Chagrin Boulevard  
Cleveland, Ohio 44122-5544  
800-628-9990

### Master Builders Solutions Canada, Inc.

1800 Clark Boulevard  
Brampton, Ontario L6T 4M7  
800-387-5862

Visit us at:

[www.master-builders-solutions.com/en-us](http://www.master-builders-solutions.com/en-us)

Follow us at:     

**LIMITED WARRANTY NOTICE:** We warrant our products to be of good quality and will replace or, at our discretion, refund the purchase price of any products proved defective. Satisfactory results depend not only upon quality products, but also upon many factors beyond our control. Therefore, except for such replacement or refund, MASTER BUILDERS SOLUTIONS MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, RESPECTING ITS PRODUCTS, and Master Builders Solutions shall have no other liability with respect thereto. Any claims regarding product defect must be received in writing within one (1) year from the date of shipment. User shall determine the suitability of the products for the intended use and assume all risks and liability in connection therewith. Any authorized change in the printed recommendations concerning the use of our products must bear the signature of the Master Builders Solutions Technical Manager.

This information and all further technical advice are based on Master Builders Solutions' present knowledge and experience. However, Master Builders Solutions assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights. MASTER BUILDERS SOLUTIONS SHALL NOT BE RESPONSIBLE FOR CONSEQUENTIAL, INDIRECT OR INCIDENTAL DAMAGES (INCLUDING LOSS OF PROFITS) OF ANY KIND. Master Builders Solutions reserves the right to make any changes according to technological progress or further developments.