

# Product in Focus

## Improve Dry Cast Pipe Production

Reduce complexity and enhance pipe appearance with Master X-Seed<sup>®</sup> 55 admixture

### The Challenge

The complexity of tight production schedules, requirement for multiple concrete mixture proportions and fluctuating production logistics can make it difficult for concrete pipe producers to compete effectively.

### The Solution

The strength-enhancement provided by Master X-Seed 55 admixture allows concrete pipe producers to reduce the number of mixtures necessary, while also improving pipe quality and lowering production costs. The value of Master X-Seed 55 admixture in concrete pipe production includes:

**Lower Material Costs:** Reduce total cementitious materials content or increase supplementary cementitious materials content, while meeting strength requirements. In many cases, the use of Master X-Seed 55 admixture permits producers to meet strength requirements with a cementitious materials content of 470 lb/yd<sup>3</sup> (280 kg/m<sup>3</sup>), the minimum permitted by ASTM C76 Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.

**Better Pipe Aesthetics and Less Patching:** Pipes produced with Master X-Seed 55 admixture experience improved swipec, less bug holes and hence, less patching, and enhanced appearance of pipe. This results in reduced number of rejected pipes (pipe on the right in the picture).

**Improved Inventory Management:** Reduce inventory costs by shipping finished product sooner, as a result of the higher early strengths achieved.

**Meeting Multiple Pipe Classifications:** Reduce complexity by producing all classes of pipe with the same mixture. This is achieved by adjusting the dosage of Master X-Seed 55 admixture to achieve higher strengths to meet the specified requirements.

**Reduce the Environmental Impact:** Reducing portland cement content in a concrete mixture helps reduce the embodied energy of the mixture. This has an overall impact on reducing the energy demand and emissions associated with the production of portland cement.

### Product Overview

Master X-Seed 55 strength-enhancing admixture is based on a proprietary BASF technology that ensures a stable suspension of synthetically-produced crystalline calcium silicate hydrate (CSH) nanoparticles. These nanoparticles facilitate the growth of CSH crystals between cement grains. This improves the overall hydration of portland cement, which helps in increasing early- and late- age strength development, with minimal impact on the time of setting of concrete.

### Reference vs. Master X-Seed 55 admixture



Reference concrete pipe (left) and pipe produced with Master X-Seed 55 admixture (right)

# Improve Dry Cast Pipe Production

## Typical Data

### Set 1

Mixture	Class 5	Class 3	
	Control	Control	With Master X-Seed 55
<b>Proportions, lb/yd<sup>3</sup> (kg/m<sup>3</sup>)</b>			
Cement – Type I/II	524 (311)	400 (237)	400 (237)
Fly Ash – Class F	131 (78)	175 (104)	175 (104)
#7 Coarse Aggregate	1350 (800)	1422 (843)	1422 (843)
Fine Aggregate	1800 (1068)	1800 (1068)	1800 (1068)
Water	208 (123)	217 (129)	217 (129)
MasterAir® AE 90, fl oz/cwt (mL/100 kg)	4.7 (305)	3.8 (250)	–
Master X-Seed 55, fl oz/cwt (mL/100 kg)	–	–	10 (650)
<b>Compressive Strength, psi (MPa)</b>			
1 day	4330 (29.9)	1240 (8.6)	2360 (16.3)
2-day	–	–	3890 (26.8)
7-day	5580 (38.5)	4470 (30.8)	5250 (36.2)
28-day	6660 (45.9)	6230 (43.0)	7530 (51.9)

### Set 2

Mixture	Class 3	
	Control	With Master X-Seed 55
<b>Proportions, lb/yd<sup>3</sup> (kg/m<sup>3</sup>)</b>		
Cement – Type I/II	541 (321)	541 (321)
#8 Coarse Aggregate	1415 (840)	1415 (840)
Fine Aggregate	2063 (1224)	2063 (1224)
Water	128 (76)	128 (76)
Master X-Seed 55, fl oz/cwt (mL/100 kg)	–	10 (650)
<b>Compressive Strength, psi (MPa)</b>		
1 day	2720 (18.8)	3250 (22.4)
7-day	5980 (41.2)	7290 (50.3)
28-day	7360 (50.8)	8770 (60.5)

## 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, BASF MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, RESPECTING ITS PRODUCTS, and BASF 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 BASF Technical Manager.

This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF 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. BASF SHALL NOT BE RESPONSIBLE FOR CONSEQUENTIAL, INDIRECT OR INCIDENTAL DAMAGES (INCLUDING LOSS OF PROFITS) OF ANY KIND. BASF reserves the right to make any changes according to technological progress or further developments.

## Contact

**United States**  
 23700 Chagrin Boulevard  
 Cleveland, Ohio 44122-5544  
 Tel: 800 628-9990 ■ Fax: 216 839-8821

**Canada**  
 1800 Clark Boulevard  
 Brampton, Ontario L6T 4M7  
 Tel: 800 387-5862 ■ Fax: 905 792-0651