# Producing Concrete Block with Slag Cement

SCA SLAG CEMENT ASSOCIATION

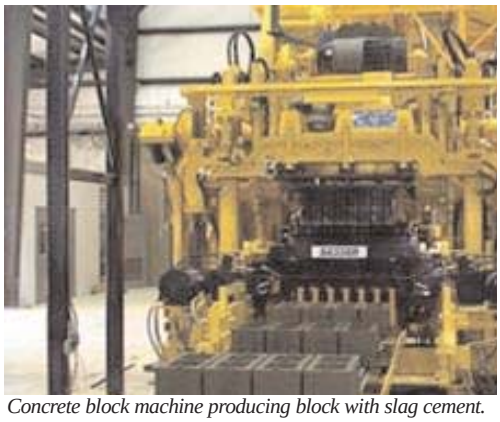


## Concrete Block

While only a few basic methods are used in the initial forming of concrete block, there are many methods of curing. Depending on the temperature and length of curing, slag cement proportioning may change. Some of the properties that slag cement can impart are:

- An architecturally appealing lighter color
- A finer, tighter surface texture or more swipe
- Reduced efflorescence
- Decreased permeability
- Increased compressive strengths

***Block manufactured with slag cement will have a lighter finished color.***



*Concrete block machine producing block with slag cement.*

## How Does Slag Affect Color?

Slag cement is lighter in color than portland cement. Block manufactured with slag cement will therefore have a lighter finished color. The higher the percentage of slag cement used, the lighter the color will be. If the block remains unpainted or unsurfaced, the lighter color is often viewed as a positive enhancement.

## How Does Slag Cement Affect Surface Texture?

Due to the fine grind and glassy structure of slag cement, the surface texture of concrete block is tighter and may increase swipe. Some manufacturers have reported reduced cycle times when slag cement is used.

***Slag cement helps reduce efflorescence.***

## How Does Slag Cement Affect Efflorescence?

Slag cement combines with calcium hydroxide and soluble salts in portland cement, locking them in the paste and reducing their migration to the surface of the unit during curing and in service, thus helping to reduce efflorescence.

*A cube of concrete block, made with slag cement, awaiting shipping.*

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## How Does Slag Cement Affect Permeability?

When slag cement is used as part of the cementitious material in a concrete block mixture, it reacts with calcium hydroxide ($Ca(OH)_2$) to form additional calcium silicate hydrate (CSH). CSH is the glue that provides strength and holds concrete together. The additional CSH produced modifies the pore structure of the paste resulting in lower permeability. The level of improvement is proportional to the percentage of slag cement in the mixture.

*Color comparison of a block made without (left) and with (right) slag cement.*

***The additional cementitous material produced by slag cement modifies the pore structure of the paste resulting in lower permeability.***

## How Does Slag Cement Affect Compressive Strength?

The curing temperature affects the compressive strength of concrete block in mixtures containing slag cement: the higher the curing temperature of the block, the higher the percentage of slag cement that can be used. Typical slag cement replacement levels for optimum strength in concrete block are between 20 percent and 50 percent.

## Proportioning Block Mixtures with Slag Cement

Concrete block manufacturers who have successfully incorporated slag cement in their products have used slag cement in ranges from 20 to 50 percent of cementitious material.

*As with all concrete mixtures, trial batches should be performed to verify concrete properties. Results may vary due to a variety of circumstances, including temperature and mixture components, among other things. You should consult your slag cement professional for assistance. Nothing contained herein shall be considered or construed as a warranty or guarantee, either expressed or implied, including any warranty of fitness for a particular purpose.*

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## *About the Slag Cement Association…*

The Slag Cement Association is the leading source of knowledge on blast-furnace slag-based cementitious products. We promote the increased use and acceptance of these products by coordinating the resources of member companies. We educate customers, specifiers and other end-users on the varied attributes, benefits and uses of these products.

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