



## TEK NOTE

October 2014

### Smooth-Face Architectural Concrete Masonry

Architectural concrete masonry units (CMU) are available in a wide variety of sizes, shapes and surface treatments. Integral color can be added to concrete masonry units further increasing the design potential. Integrally colored concrete masonry block units provide a long lasting, low maintenance, attractive finish to masonry structures.

A proper understanding of the benefits and limitations of integrally colored CMU can assist in meeting satisfactory expectations for the finished masonry wall assembly. This will help to avoid possible disappointment in the wall's appearance. Since CMU is a natural material some color variation can occur between units. Split-face, split-ribbed, and ground-face block are the most color consistent providing attractive concrete masonry walls. It should be noted that standard **smooth-face** CMU walls will exhibit some color variation. This variation is characteristic of the manufacturing process and can even be seen in standard gray units. Furthermore, smooth texture CMU walls are sensitive to color and/or texture alteration from the effects of the field procedures of cleaning and sealing.

Through established quality control processes concrete block manufacturers strive to produce a consistent, uniform product. However, there are some production factors contributing to color variation in smooth-face CMU.

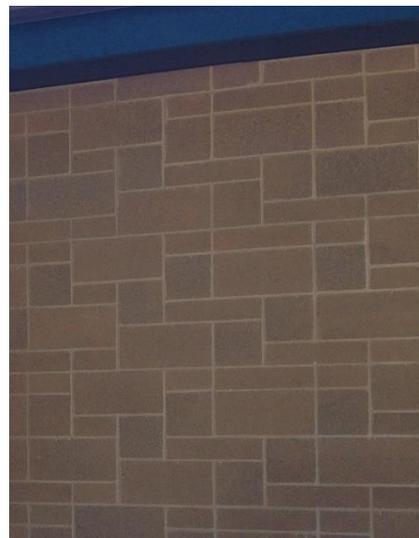
These include:

1. During the unit molding process the steel mold box slides over the block face drawing moisture from the concrete mixture to the surface. This moisture movement draws additional coloring pigments to the block surface. A cement paste slick forms which impacts the colored surface appearance.
2. During the steam curing stage the block are exposed to some variability in the moisture and temperature conditions within the kiln, impacting the curing rate.
3. Various block sizes or shapes required for a project may be made at different times within a production run.

Beyond the smooth-face unit manufacturing issues discussed, these units are also the most difficult to clean.

Extra care must be taken to keep them clean during construction because any aggressive cleaning method will change their appearance. Mortar or grout smears requiring cleaning from the wall surface are the same cementitious material as the smooth block surface. Cleaning removes small amounts of cement paste from the unit's surface. If more paste is removed in some areas than in others, or if a thicker slick forms on some units, the wall will look unnaturally blotchy or streaky.

Smooth-face CMU have been used successfully as design elements for many masonry walls. The NWCMA **recommends** using this product for accenting, banding or blending. When specifying a single-color, smooth-face CMU for large wall areas it should be expected there will be some variation in color and/or texture. If you desire a **uniformly** colored CMU wall, in a smooth texture, NWCMA suggests using a pigmented stain or an opaque coating rather than an integral colored CMU. This will hide or blend variations in color or streaking into a more homogeneous finished wall appearance. Using ground-face units is another design option available. These units have the cement paste surface removed during grinding and are more color consistent and easier to clean than standard smooth-face CMU.



*Typical CMU wall color variation with smooth-face units*

## Specifying Colored Concrete Masonry

With all architectural CMU, specify the submittal of samples showing the color range of each unit type to be used on a project. ASTM C-90 calls for a sample consisting of not less than four units. It is recommended that a jobsite mock-up panel be constructed to demonstrate that the materials and workmanship to be used will produce the desired results. The panel should be cleaned and sealed per the project specifications prior to evaluation. It will serve as the approved aesthetic standard for the project to be used as a comparison for the finished work.



*Designers should understand the appearance issues with smooth-face concrete masonry walls.*

Cleaning procedures for integrally colored CMU should be included in the project specification. Request product information and application procedures from the cleaning product manufacturer, concrete block supplier or mason contractor. Cleaning requirements can be reduced by exercising care during masonry construction.

The commonly recommended cleaning methods for architectural CMU include high pressure water cleaning or light abrasive blast cleaning. Whatever cleaning method is used, care should be taken to avoid discoloring the concrete masonry. **Do not** use muriatic acid to clean architectural concrete masonry. It is advisable to clean a small, inconspicuous location before proceeding with cleaning the entire wall.<sup>1</sup>

### Cleaning guidelines when using a cleaning solution:

- Thoroughly prewet the wall with low water pressure (50 psi max)
- Apply the solution using low pressure spray (50 psi max)
- Pressure water rinse using 800-1,000 psi with a wide flange tip directing the spray at a 45° angle to the wall.

### Cleaning guidelines when sweep sandblasting:

- Use a maximum pressure of 100 psi
- Use #60 grit sand for smooth-face concrete block
- Softer abrasives such as corn husks or walnut shells can be used under certain conditions.

<sup>1</sup>National Concrete Masonry Association technical note number 8-4A provides additional cleaning information.

For further information on how to put concrete masonry to work for you contact:

**Basalite Concrete Products, LLC**  
[www.basalite.com](http://www.basalite.com)

**Western Materials**  
[www.westernmaterials.com](http://www.westernmaterials.com)

**Central Pre-Mix Concrete Products Co.**  
[www.centralpremix.com](http://www.centralpremix.com)

**White Block Co.**  
[www.whiteblockcompany.com](http://www.whiteblockcompany.com)

**Eastside Masonry Products**  
[www.eastsidemasonry.com](http://www.eastsidemasonry.com)

**Willamette Graystone, Inc.**  
[www.willamettegraystone.com](http://www.willamettegraystone.com)

**Mutual Materials Co.**  
[www.mutualmaterials.com](http://www.mutualmaterials.com)

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