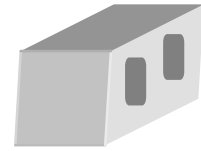




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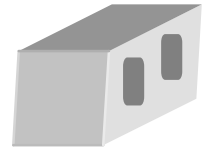
Technical Services TECH Note RILEM Test Method No. II.4

Product Data literature for all products evaluated

Material Safety Data Sheets for all products evaluated



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**FOR:** Terri Crawford  
**Cc:** Craig Frieze  
Mike Dickey

**SUBJECT:** Kansas Building Products  
Wichita, Kansas

**DATE:** March 19, 2001  
**PROJECT:** 0102-04 BP

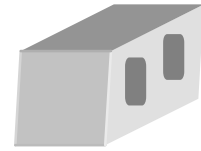
**SAMPLES SUBMITTED:**

<u>Block</u>	<u>Color</u>	<u>Size</u>
Smooth face CMU w/ secondary efflorescence	"Kansas Tan"	16" x 8" x 4"
Rough face CMU w/ secondary efflorescence	"Kansas Tan"	16" x 8" x 4"
Smooth face CMU	"Derby Tan"	16" x 8" x 4"
Rough face CMU	"Derby Tan"	16" x 8" x 4"

**Submitted by:** Ms. Terri Crawford



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## PURPOSE OF TESTING:

Two integrally colored CMU with a rough face finish on one side and a smooth face finish on the other side with large, small and fine aggregate were submitted for testing using PROSOCO's new construction cleaning and water repellent products.

**A. Cleaning Concrete Masonry Units:** Sure Klean® Custom Masonry Sealer was evaluated for removal of laboratory applied mortar.

To simulate new construction soiling, all CMUs are placed on a bench with finished surface facing upward. Hollow cylinders measuring 50 mm in diameter and 75 mm tall are positioned on top of each CMU and filled with a wet mixture of Type S cementitious mortar. The wet, mortar-filled cylinder is allowed to remain in contact with the CMU for 10 minutes before removal.

Soiled CMUs are allowed to dry before test cleaning.

Heavy deposits of mortar are removed with dry scraping after 24 hours. Prepared cleaning solutions are then evaluated for their effectiveness in removing residual Type S mortar staining after 14 days of curing.

Refer to “\*Note: When cleaning integrally colored CMU” in the following section, “Surface Alteration Testing.”

**B. Surface Alteration Testing -** Sure Klean® Custom Masonry Cleaner was tested at various dilutions to determine if a cleaning program implemented to remove excess mortar and related new construction soiling would otherwise alter the appearance of cleaned surfaces. Surface Alteration was evaluated visually based upon perceived discoloration or erosion/etching of the masonry unit.

Aggregate Exposure is the visual examination of the CMU comparing aggregate exposure of the untreated control surface to surfaces cleaned with selected product(s) at given dilutions.

Surface Pigment Alteration/Removal\* is the visual examination of the CMU comparing the surface pigmentation of the untreated control to surfaces cleaned with selected product(s) at given dilutions.

Matrix Erosion is the visual examination comparing the untreated control surface to surfaces cleaned with selected products at given dilutions looking for any potential erosion/digestion of the cementitious matrix of the CMU.

Staining is the visual examination for changes that are the result of a chemical reaction that leaves a staining precipitate.

The following is the scale used for reporting results of all categories:

0 – no change	3 – heavy
1 – slight	4 – excessive
2 – moderate	

**\* NOTE: When cleaning integrally colored CMU.**

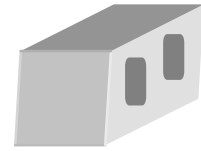
Integrally colored concrete masonry units (CMUs) frequently have high amounts of pigments concentrated on the surface of the cured concrete unit. Variation of surface pigment concentrations from one CMU to the next creates a blotchy appearance in the completed wall. Allowed to remain on the surface of the CMU, the weakly bound pigment will weather and streak, further detracting from the appearance of the completed CMU wall.

In addition to removing excess mortar and construction related soiling, the goal of any cleaning operation undertaken on integrally colored CMU should include removal of unnaturally high concentrations of surface pigment. By revealing the natural through-body color on the integrally colored unit, the overall color uniformity and weathering resistance of the completed CMU wall is improved.

**C. Protective Water Repellents -** Sure Klean® Custom Masonry Sealer and Sure Klean® Weather Seal Siloxane WB Concentrate were evaluated for their ability to provide water repellency to the submitted samples using RILEM method II.4.



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## CLEANING PRODUCTS EVALUATED

BLOCK TYPE	Custom Masonry Cleaner
All Colors of Rough and Smooth Face CMUs	1:2
	1:4
	1:6

## SURFACE ALTERATION PRODUCTS EVALUATED

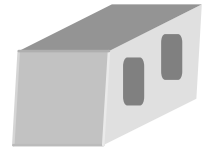
BLOCK TYPE	Custom Masonry Cleaner
All Colors of Rough and Smooth Face CMUs	1:2
	1:4
	1:6

## WATER REPELLENT PRODUCTS EVALUATED

Block Type	Product	Dilution
All Colors of Rough Face CMUs	Sure Klean <sup>®</sup> Custom Masonry Sealer	Concentrate
	Sure Klean <sup>®</sup> Weather Seal Siloxane WB Concentrate	1:9



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## SECTION A – CLEANING INTEGRALLY COLORED CMUs

### DESCRIPTION OF PRODUCTS EVALUATED

These cleaning trials were conducted to determine the optimal cleaning/cure time combination.

**Sure Klean® Custom Masonry Cleaner** – A general purpose, concentrated acidic cleaner for most custom masonry and colored concrete. Removes concrete splashes, excess mortar, mud, heavy efflorescence and surface soiling, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 2-6 parts water. Apply by brush or low-pressure spray.

### TEST METHOD – Cleaning

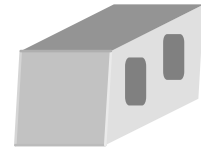
Dilution ratios refer to mixtures of parts concentrated cleaner : parts fresh water. Chemical cleaners were evaluated using the following procedure:

1. Pre-wet the surface with water.
2. Apply each cleaner at the appropriate dilutions.
3. Allow 3-minute exposure time.
4. Reapply the products and moderately agitate with a brush.
5. Pressure rinse thoroughly.\*

\* Pressure rinsing was conducted at approximately 1300 psi with a warm water flow rate of 1.9 gallons per minute.



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## Test Results - Cleaning

Block Type	Cleaner	Dilution	# Applications	Cure	Effectiveness
"Kansas Tan" Smooth Face CMU	Custom Masonry Cleaner	1:2	2	14 day	100%
		1:4	2		100%
		1:6	2		100%

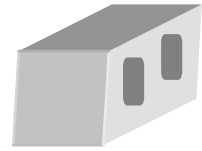
Block Type	Cleaner	Dilution	# Applications	Cure	Effectiveness
"Kansas Tan" Rough Face CMU	Custom Masonry Cleaner	1:2	2	14 day	100%
		1:4	2		100%
		1:6	2		100%

Block Type	Cleaner	Dilution	# Applications	Cure	Effectiveness
"Derby Tan" Smooth Face CMU	Custom Masonry Cleaner	1:2	1	14 day	100%
		1:4	1		100%
		1:6	1		100%

Block Type	Cleaner	Dilution	# Applications	Cure	Effectiveness
"Derby Tan" Rough Face CMU	Custom Masonry Cleaner	1:2	1	14 day	100%
		1:4	1		100%
		1:6	1		100%



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## CONCLUSIONS - Cleaning:

Based on the test data, all of the submitted block samples were efficiently cleaned with each dilution Sure Klean<sup>®</sup> Custom Masonry Cleaner. Use higher concentrations and surface agitation to maximize aggregate exposure. Use low concentration and surface agitation to minimize aggregate exposure.

The "Kansas Tan" Rough and Smooth Face CMU with secondary efflorescence required that two applications of the cleaner be used to remove the entire white residue. All other block types were effectively cleaned with just one application of each dilution of Sure Klean<sup>®</sup> Custom Masonry Cleaner.

All dilutions of Sure Klean<sup>®</sup> Custom Masonry Cleaner tested affected the substrate in a similar manner, removing heavy concentrations of pigmented matrix from the rough and smooth block faces, exposing small and large aggregate, and enhancing the natural appearance of the integrally colored concrete masonry unit.

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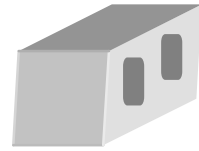
## RECOMMENDED PRODUCTS AND DILUTIONS - CLEANING:

Based on these evaluations, all of the dilutions of Custom Masonry Cleaner tested can be recommended for job site testing. They all are effective in removing excess mortar, and they all assist in improving the color and uniformity of these concrete blocks. The most appropriate cleaner and dilution should be determined on the specific job-site, and will be dependent primarily on the nature and severity of soiling present at that location.

Note: To remove excess mortar while minimizing aggregate exposure and color enhancement, clean within 7 days of completion using Custom Masonry Cleaner diluted with 6 parts fresh water.



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## **SECTION B – Surface Alterations:**

### **DESCRIPTION OF PRODUCTS EVALUATED – Surface Alterations:**

**Sure Klean® Custom Masonry Cleaner** – A general purpose, concentrated acidic cleaner for most custom masonry and colored concrete. Removes concrete splashes, excess mortar, mud, heavy efflorescence and surface soiling, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 2-6 parts water. Apply by brush or low-pressure spray.

---

### **TEST METHOD – Surface Alteration Testing:**

Dilution ratios refer to mixtures of concentrated cleaner : fresh water.

Sure Klean® Custom Masonry Cleaner evaluated at dilutions of 1:2, 1:4, and 1:6. The following procedure was used:

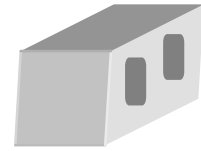
1. Pre-wet the surface with water.
2. Apply each cleaner at the appropriate dilutions.
3. Allow 3-minute exposure time.
4. Re-apply the products and moderately agitate with a brush.
5. Pressure rinse thoroughly.\*
6. Allow the surface to dry for at least 18 hours and visually examine.

\* Pressure rinsing was conducted at approximately 1300 psi with a warm water flow rate of 1.9 gallons per minute.





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**Surface Alteration Results:**

<b>Substrate:</b> Smooth Face CMU		<b>Pigment Color:</b> "Kansas Tan"			
<b>Product</b>	<b>Dilution</b>	<b>Aggregate Exposure</b>	<b>Surface Pigment Alteration/Removal</b>	<b>Matrix Erosion</b>	<b>Staining</b>
Custom Masonry Cleaner *	1:2	2	0	2	0
Custom Masonry Cleaner *	1:4	2	0	2	0
Custom Masonry Cleaner *	1:6	1	0	1	0
<b>Substrate:</b> Rough Face CMU		<b>Pigment Color:</b> "Kansas Tan"			
<b>Product</b>	<b>Dilution</b>	<b>Aggregate Exposure</b>	<b>Surface Pigment Alteration/Removal</b>	<b>Matrix Erosion</b>	<b>Staining</b>
Custom Masonry Cleaner *	1:2	2	0	2	0
Custom Masonry Cleaner *	1:4	2	0	2	0
Custom Masonry Cleaner *	1:6	1	0	1	0
<b>Substrate:</b> Smooth Face CMU		<b>Pigment Color:</b> "Derby Tan"			
<b>Product</b>	<b>Dilution</b>	<b>Aggregate Exposure</b>	<b>Surface Pigment Alteration/Removal</b>	<b>Matrix Erosion</b>	<b>Staining</b>
Custom Masonry Cleaner	1:2	2	0	2	0
Custom Masonry Cleaner	1:4	2	0	2	0
Custom Masonry Cleaner	1:6	1	0	1	0
<b>Substrate:</b> Rough Face CMU		<b>Pigment Color:</b> "Derby Tan"			
<b>Product</b>	<b>Dilution</b>	<b>Aggregate Exposure</b>	<b>Surface Pigment Alteration/Removal</b>	<b>Matrix Erosion</b>	<b>Staining</b>
Custom Masonry Cleaner	1:2	2	0	2	0
Custom Masonry Cleaner	1:4	2	0	2	0
Custom Masonry Cleaner	1:6	1	0	1	0

Scale used for reporting results of all categories

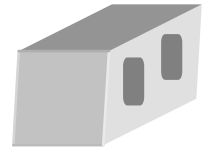
0 – no change  
1 – slight  
2 – moderate

3 – heavy  
4 – excessive

\*Two cleaning applications were needed on "Kansas Tan" Smooth and Rough Face to remove the secondary efflorescence from the CMU.



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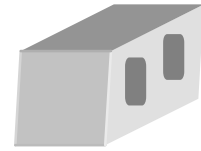


“Derby Tan”





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## **SECTION C - PROTECTIVE WATER REPELLENTS:**

The testing described below evaluates the suitability of water repellent treatments.

The surface treatments evaluated were selected for their suitability for application based on the following selection criteria:

1. Weatherproofing properties
2. Color change
3. Ease of application

---

## **DESCRIPTIONS OF PRODUCTS EVALUATED - Protective Water Repellents:**

**Sure Klean® Custom Masonry Sealer** - A clear, solvent-based silicone elastomer formulated to weatherproof custom masonry units, cast stone, and concrete block without altering the natural appearance. Custom Masonry Sealer penetrates and fills pores to prevent water penetration through exterior walls exposed to normal weathering as well as long-lasting protection against many types of graffiti.

**Sure Klean® Weather Seal Siloxane WB Concentrate** – A self-emulsifying water repellent concentrate designed for dilution with fresh water at the jobsite. This solvent-free blend of silanes and oligomeric alkoxy siloxanes mixes easily with water to produce a penetrating water repellent ideal for application to dense or porous masonry surfaces.

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## **SAMPLE PREPARATION - Protective Water Repellents:**

The submitted blocks were scored, allowed to dry, and to reabsorb atmospheric humidity for 24 hours prior to treatment. The treatment method consisted of a wet-on-wet brush application. All treatments were allowed to cure at least 72 hours prior to testing.

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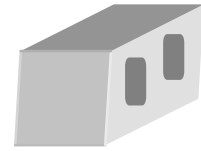
## **TEST METHODS - Protective Water Repellents:**

### **Water Absorption Tube Test: RILEM II.4, 60 mph, 20 Minutes**

The water absorption tube test simulating wind driven rain conditions was performed. This test simulates 60 mile per hour wind driven rain conditions for a period of 20 minutes.



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## TEST RESULTS - Protective Water Repellents:

Water Absorption Tube Test: RILEM II.4, 60 mph, 20 Minutes

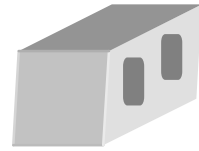
	RESULTS
<b>“Kansas Tan” Smooth Face CMU</b>	
Untreated Control	<40 mph
Custom Masonry Sealer	60 mph
Siloxane WB Concentrate (1:9)	60 mph
<b>“Kansas Tan” Rough Face CMU</b>	
Untreated Control	<40 mph
Custom Masonry Sealer	60 mph
Siloxane WB Concentrate (1:9)	55 mph
<b>“Derby Tan” Smooth Face CMU</b>	
Untreated Control	<40 mph
Custom Masonry Sealer	60 mph
Siloxane WB Concentrate (1:9)	60 mph
<b>“Derby Tan” Rough Face CMU</b>	
Untreated Control	<40 mph
Custom Masonry Sealer	60 mph
Siloxane WB Concentrate (1:9)	59 mph

“Derby Tan”





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## CONCLUSIONS - Protective Water Repellents:

Based upon laboratory evaluations, Sure Klean<sup>®</sup> Custom Masonry Sealer and Sure Klean<sup>®</sup> Weather Seal Siloxane WB Concentrate at a 1:9 dilution provided adequate water repellency protection to all submitted types of CMUs from Kansas Building Products in Wichita, KS.

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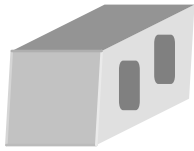
## RECOMMENDATIONS - Protective Water Repellents:

Based on evaluations, both Sure Klean<sup>®</sup> Custom Masonry Sealer and Sure Klean<sup>®</sup> Weather Seal Siloxane WB Concentrate, at a 1:9 dilution, can be recommended for jobsite testing on all submitted Kansas Building Product's CMU types.

Apply all products in accordance with the manufacturer's recommendation provided on container labels and product data sheets. On-site testing should be conducted to determine the most appropriate water repellent product and procedures for a particular project. See product literature for additional application and product information.

Carmen M. Hupp  
Project Testing Coordinator

CMH/csm



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***Laboratory Report***

**Block Program Evaluation**

**Kansas Building Products  
Wichita, KS**

***Project No. 0102-04 BP***

***Prepared For:***

**Ms. Terri Crawford  
Kansas Building Products  
Wichita, Kansas**

***Prepared By:***



***PROSOCO, Inc.  
March 2001***