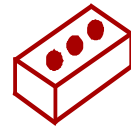




# PALLET CARD PROGRAM LABORATORY REPORT



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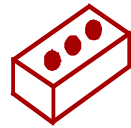
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### ATTACHMENTS

- ASTM C 67 Immersion Testing
- 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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PROSOCO, Inc.

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**FOR:** Steve Young  
Boral Brick  
212 North Loop 336 East  
Conroe, TX 77301

**cc:** Paul Tessier  
Jack James  
Robert Holmes

**SUBJECT:** Boral Brick  
Marshall, TX

**DATE:** January 15, 2001

**PROJECT:** 0011-21 PC

**SAMPLES SUBMITTED:** 2 styles of clay brick w/ 1 sleeve each

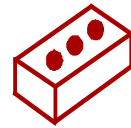
“Village Park” (VP), orange clay w/ white wash finish  
Size: 2.5" x 2.5" x 9.5"

“Sierra” (SE), orange clay w/ black sandy finish  
Size: 2.5" x 2.5" x 9.5"

Submitted by: Paul Tessier



# PALLET CARD PROGRAM LABORATORY REPORT



**PURPOSE OF TESTING:**

Samples of clay brick units were submitted to PROSOCO, Inc.'s Testing Laboratory with a request to determine if application of the products evaluated will produce any adverse effects during new construction cleaning operations. Additionally, the effectiveness of water repellents, suitable for clay brick masonry, will be evaluated.

- A. New Construction Cleaning** – Sure Klean® New Construction Cleaners were evaluated for removal of laboratory applied mortar.

To simulate new construction soiling, the ability of each cleaner to remove hardened deposits of type N cementitious mortar was evaluated and is reported below. Mortar was applied by placing the fired clay units face down in a smooth-finished tray of mortar for 10 minutes. The mortar was cured at 75% ± 5% RH and 70°F ± 5°F before any cleaning tests were attempted. Sure Klean® 101 Lime Solvent, Sure Klean® 600 Detergent, Sure Klean® Vana Trol®, and 1910 Vana Trol® were tested for removal of type N gray masonry cement mortar after 7, 14 and 21 days of curing.

- B. Surface Alteration Testing** - Sure Klean® 101 Lime Solvent, Sure Klean® 600 Detergent, Sure Klean® Vana Trol®, and 1910 Vana Trol® were tested at various dilutions to determine if they would produce any adverse effects during the cleaning process. Adverse effects were evaluated visually and were based upon damage to the surface coating, discoloration or erosion/etching of the masonry unit.
- C. Protective Water Repellents** - Sure Klean® Weather Seal Siloxane PD and Sure Klean® Weather Seal Siloxane WB Concentrate were evaluated for their ability to provide water repellency to the submitted samples.

**PRODUCTS EVALUATED:**

Dilution ratios refer to mixtures of parts concentrated product : parts fresh water.

**CLEANING PRODUCTS**

BRICK TYPE	101 Lime Solvent	600 Detergent	Vana Trol®	1910 Vana Trol®
All submitted brick samples	1:6	1:6	1:6	1:6
	1:8	1:8	1:8	1:8

**SURFACE ALTERATION PRODUCTS EVALUATED**

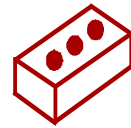
BRICK TYPE	101 Lime Solvent	600 Detergent	Vana Trol®	1910 Vana Trol®
All submitted brick samples	1:6	1:6	1:6	1:6
	1:8	1:8	1:8	1:8

**WATER REPELLENT PRODUCTS EVALUATED**

Sample	Siloxane PD	Siloxane WB
All submitted brick samples	Concentrate	1:9



# PALLET CARD PROGRAM LABORATORY REPORT



## SECTION A – NEW CONSTRUCTION CLEANING

### DESCRIPTION OF PRODUCTS EVALUATED – New Construction Cleaning

These cleaning trials were conducted to determine the optimal cleaning/cure time combination to most efficiently remove type N mortar from the submitted fired clay units.

Type N cementitious mortar was prepared in compliance with the manufacturers instructions, applied to the brick surface and allowed to cure for 7, 14 and 21 days prior to removal with high pressure water rinse using pressure rinsing equipment and chemical assist. The removal of gray Type N cementitious masonry cement mortar after 7, 14, and 21 days of curing was visually evaluated.

**Sure Klean® 101 Lime Solvent** -- A general purpose, concentrated acidic cleaner for dark colored brick, tile and concrete surfaces. Dissolves mortar smears and construction dirt quickly, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 4-10 parts water. Apply by brush or low-pressure spray.

**Sure Klean® 600 Detergent** – A general purpose, concentrated acidic cleaner for brick, tile and concrete surfaces. Dissolves mortar smears and construction dirt quickly, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 4-25 parts water. Apply by brush or low-pressure spray.

**Sure Klean® Vana Trol®** - A concentrated acidic cleaner for new masonry surfaces that are subject to vanadium, manganese and other metallic stains. Use on: gray, brown, white and most light-colored brick; natural stone; cast stone. Dissolves mortar smears and construction dirt quickly, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 4-25 parts water. Apply by brush or low-pressure spray.

**Sure Klean® 1910 Vana Trol®** - A concentrated acidic cleaner for new masonry surfaces that are subject to vanadium, manganese and other metallic stains. 1910 Vana Trol® is designed to simplify rinsing, and reduces potential for efflorescence.

### TEST METHOD – New Construction Cleaning

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

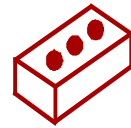
1. Prewet the surface with water.
2. Apply the cleaner.
3. Allow the appropriate dwell time, as specified.
 

101 Lime Solvent.....	3 minutes
600 Detergent.....	5 minutes
Vana Trol® .....	5 minutes
1910 Vana Trol® .....	5 minutes
4. Pressure rinse thoroughly.\*

\*Pressure rinsing was conducted at approximately 800 psi with a warm water flow rate of 1.9 gallons per minute.



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## Test Results - New Construction Cleaning

### % Removal

#### “Village Park”

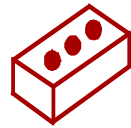
	<u>7 day</u>	<u>14 day</u>	<u>21 day</u>
101 Lime Solvent (1:6)	100%	100%	100%
101 Lime Solvent (1:8)	100%	100%	100%
600 Detergent (1:6)	100%	100%	100%
600 Detergent (1:8)	100%	100%	100%
Vana Trol® (1:6)	100%	100%	100%
Vana Trol® (1:8)	100%	100%	100%
1910 Vana Trol® (1:6)	100%	100%	100%
1910 Vana Trol® (1:8)	100%	100%	100%

#### “Sierra”

	<u>7 day</u>	<u>14 day</u>	<u>21 day</u>
101 Lime Solvent (1:6)	100%	100%	100%
101 Lime Solvent (1:8)	100%	100%	100%
600 Detergent (1:6)	100%	100%	100%
600 Detergent (1:8)	100%	100%	100%
Vana Trol® (1:6)	100%	100%	100%
Vana Trol® (1:8)	100%	100%	100%
1910 Vana Trol® (1:6)	100%	100%	100%
1910 Vana Trol® (1:8)	100%	100%	100%



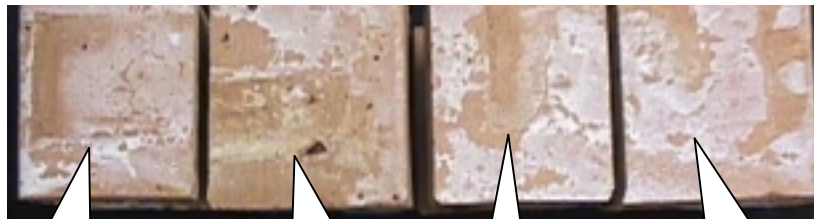
# PALLET CARD PROGRAM LABORATORY REPORT



**“Village Park”  
BEFORE**



**“Village Park”  
AFTER**



**101 Lime  
Solvent**

**600  
Detergent**

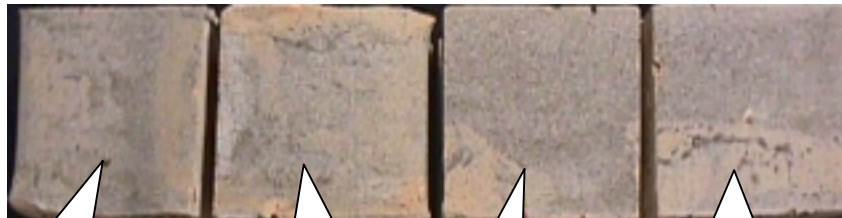
**Vana  
Trol®**

**1910 Vana  
Trol®**

**“Sierra”  
BEFORE**



**“Sierra”  
AFTER**



**101 Lime  
Solvent**

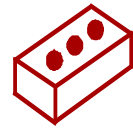
**600  
Detergent**

**Vana  
Trol®**

**1910 Vana  
Trol®**



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## CONCLUSIONS - Cleaning:

Based on the test results, all cleaners and all dilutions performed extremely well in removing excess mortar smears on the submitted brick samples. The cleaners performed well in removing the mortar soils even after allowing the mortar to remain on the surface of the brick for 21 days under ideal curing conditions.

It is also recommended that the selected cleaners always be used in the lowest possible concentration, typically a 1:8 dilution for 101 Lime Solvent, 600 Detergent, and Vana Trol<sup>®</sup>. They should be rinsed with the lowest pressure of water as practical, garden hose strength preferred, to minimize removal of the decorative sand finish. To facilitate easier removal of excess mortar and construction dirt while minimizing any potential adverse affect on the decorative sand finish, clean within 7 days of construction.

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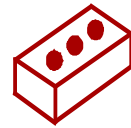
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## RECOMMENDED PRODUCTS AND DILUTIONS - CLEANING:

Sample	Sure Klean <sup>®</sup> 101 Lime Solvent	Sure Klean <sup>®</sup> 600 Detergent	Sure Klean <sup>®</sup> Vana Trol <sup>®</sup>	Sure Klean <sup>®</sup> 1910 Vana Trol <sup>®</sup>
"Village Park"	1:8	1:8	1:8	1:8
"Sierra"	1:8	1:8	1:8	1:8



# PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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## SECTION B – Surface Alterations:

### DESCRIPTION OF PRODUCTS EVALUATED – Surface Alterations:

**Sure Klean® 101 Lime Solvent** -- A general purpose, concentrated acidic cleaner for dark colored brick, tile and concrete surfaces. Dissolves mortar smears and construction dirt quickly, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 4-10 parts water. Apply by brush or low-pressure spray.

**Sure Klean® 600 Detergent** - A general purpose, concentrated acidic cleaner for brick, tile and concrete surfaces. Dissolves mortar smears and construction dirt quickly, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 4-12 parts water. Apply by brush or low-pressure spray.

**Sure Klean® Vana Trol®** - A concentrated acidic cleaner for new masonry surfaces that are subject to vanadium, manganese and other metallic stains. Designed for use on gray, brown, white and most light-colored brick, natural stone and cast stone. Dissolves mortar smears and construction dirt quickly, leaving the masonry clean and uniform with no acid burning or streaking. Liquid concentrate for dilution with 4-10 parts water. Apply by brush or low-pressure spray.

**Sure Klean® 1910 Vana Trol®** - A concentrated acidic cleaner for new masonry surfaces that are subject to vanadium, manganese and other metallic stains. 1910 Vana Trol® is designed to simplify rinsing, and reduces potential for efflorescence.

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### TEST METHOD – Surface Alteration Testing:

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

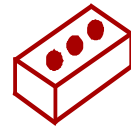
1. Prewet the surface with water.
2. Apply each cleaner at the appropriate dilutions.
3. Allow a 5-minute exposure time.
4. Reapply the products and moderately agitate with a brush.
5. Pressure rinse thoroughly.\*
6. Allow the surface to dry for at least 18 hours and visually examine.

\* Pressure rinsing was conducted at approximately 800 psi with a warm water flow rate of 1.9 gallons per minute.





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**Surface Alteration Results:**

<b>Substrate: "Village Park"</b>		<b>Pigment Color: Orange w/ white flaky finish</b>			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
101 Lime Solvent	1:6	1	0	0	0
101 Lime Solvent	1:8	1	0	0	0
600 Detergent	1:6	1	0	0	0
600 Detergent	1:8	1	0	0	0
Vana Trol <sup>®</sup>	1:6	1	0	0	0
Vana Trol <sup>®</sup>	1:8	1	0	0	0
1910 Vana Trol <sup>®</sup>	1:6	1	0	0	0
1910 Vana Trol <sup>®</sup>	1:8	1	0	0	0
<b>Substrate: "Sierra"</b>		<b>Pigment Color: Orange w/ fine sandy brown finish</b>			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
101 Lime Solvent	1:6	0	0	0	0
101 Lime Solvent	1:8	0	0	0	0
600 Detergent	1:6	0	0	0	0
600 Detergent	1:8	0	0	0	0
Vana Trol <sup>®</sup>	1:6	0	0	0	0
Vana Trol <sup>®</sup>	1:8	0	0	0	0
1910 Vana Trol <sup>®</sup>	1:6	0	0	0	0
1910 Vana Trol <sup>®</sup>	1:8	0	0	0	0

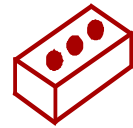
Scale used for reporting results of all categories

0 – no change  
1 – slight  
2 – moderate

3 – heavy  
4 – excessive



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PROSOCO, Inc.

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## CONCLUSIONS – Surface Alterations:

Test results show that a small amount of the flaky white finish on brick type “Village Park” was removed during the cleaning process. This was mainly due to pressure rinsing. No other alterations were found with either brick.

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## RECOMMENDATIONS – Surface Alterations:

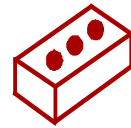
All of the cleaners tested can be recommended. Cleaners should be used in the lowest possible concentration, typically a 1:8 dilution. Rinse thoroughly with low water pressure, garden hose strength, to minimize removal of the decorative finish. Conduct all cleaning within seven days of soiling to facilitate easier removal of excess mortar and construction dirt.

Apply all products in accordance with the manufacturer’s recommendation provided on container labels and product data sheets. On-site testing should always be conducted to determine the most appropriate cleaning product and procedures for a particular project.

See product literature for additional application and product information.



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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

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

**Sure Klean<sup>®</sup> Weather Seal Siloxane PD** - A low odor, alkaline stable, water-based blend of silanes and oligomeric alkoxy siloxanes. Weather Seal Siloxane PD is supplied pre-diluted and is designed for use on concrete and clay masonry surfaces. Weather Seal Siloxane PD penetrates more deeply than conventional water or solvent-based water repellents.

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

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

The submitted brick were cut, oven dried and allowed to reabsorb atmospheric humidity for 24 hours prior to treatment. The treatment method consisted of two 10-second immersions with a 20-second absorption period between immersions to simulate a wet-on-wet application. All treatments were allowed to cure for at least 14 days prior to testing.

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

### **Water Absorption: ASTM C 67, Immersion**

Water absorption was determined by comparing the dry weight of the sample with its weight after immersion in water at 10-minute, 30-minute, 60-minute and 24-hour intervals. See ASTM C 67 for additional information.

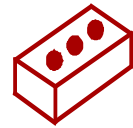
Reduced water absorption values – reported as effectiveness – measure the effectiveness of selected treatments in protecting samples from water penetration and water related decay mechanisms. Generally a reduction of approximately 80% is required to provide resistance to water intrusion under normal exposure conditions.

### **Water Absorption Tube Test: RILEM II.4, 5.0 milliliters, 20 minutes**

The water absorption tube test simulating wind driven and wind blown rain conditions was also performed. Tests were run with 5.0 milliliter head pressures. Filled to 5 milliliters, a water absorption tube produces a 98 mph dynamic wind pressure. See RILEM II.4 Tech Note for additional information.



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The ranking system used to evaluate the effectiveness of the products applied to each submitted sample is as follows:

**AA** = "Above Average" correlates to less than or equal to 20% of the maximum untreated absorption.

**A** = "Average" correlates to less than or equal to 50% of the maximum untreated absorption

**BA** = "Below Average" correlates to greater than 50% of the maximum untreated absorption.

EXAMPLE: If RILEM tubes applied to an untreated sample result in loss of 5 ml of water or more, then:

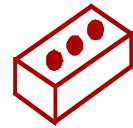
A rating of **AA** *Above Average* water repellent performance would require loss of no more than  $5 \text{ ml} \times 20\% = 1 \text{ ml}$ .

A rating of **A** *Average* water repellent performance would require loss of no more than  $5 \text{ ml} \times 50\% = 2.5 \text{ ml}$ .

A rating of **BA** *Below Average* water repellent performance would be reported for treatments which result in a loss of more than  $50\% \times 5 \text{ ml} = 2.5 \text{ ml}+$ .



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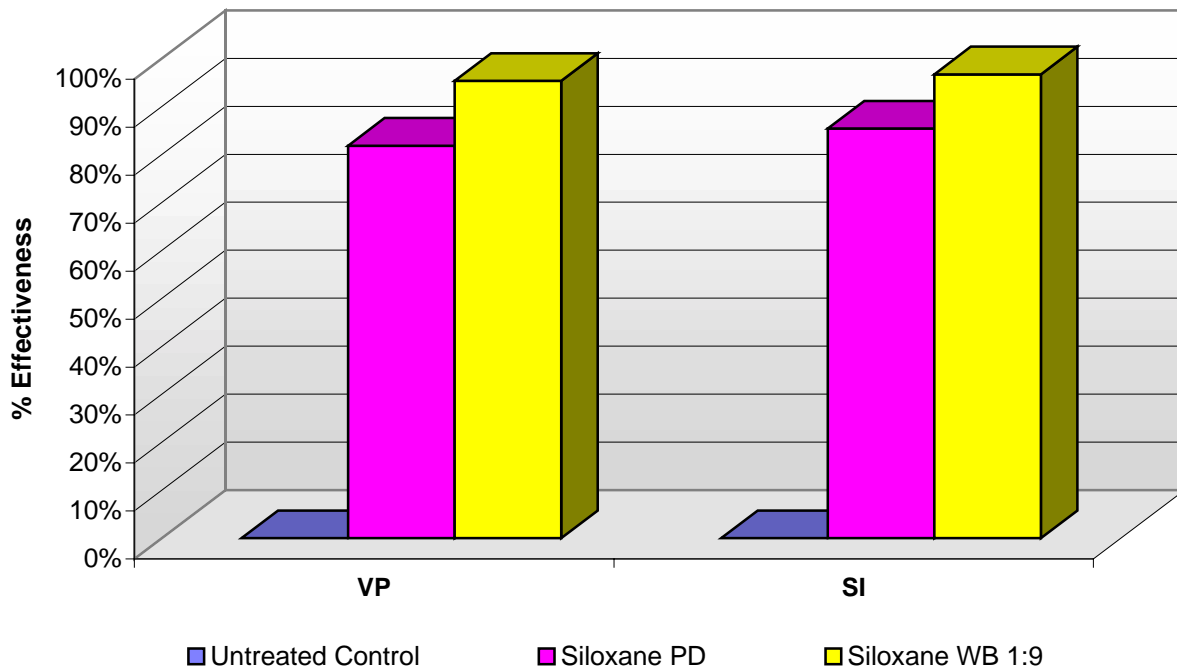
## TEST RESULTS - Protective Water Repellents:

### Water Absorption: ASTM C 67, Immersion

"Village Park"	% Absorption	% Effectiveness
Untreated Control	6.55	--
Siloxane PD	1.19	81.9%
Siloxane WB (1:9)	0.30	95.4%
"Sierra"	% Absorption	% Effectiveness
Untreated Control	7.46	--
Siloxane PD	1.09	85.5%
Siloxane WB (1:9)	0.24	96.7%

### Water Absorption: ASTM C 67, Immersion

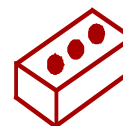
#### Average % Effectiveness



Graph 1



# PALLET CARD PROGRAM LABORATORY REPORT



### TEST RESULTS - Protective Water Repellents:

Water Absorption Tube Test: RILEM II.4, 5.0 milliliters, 20 Minutes

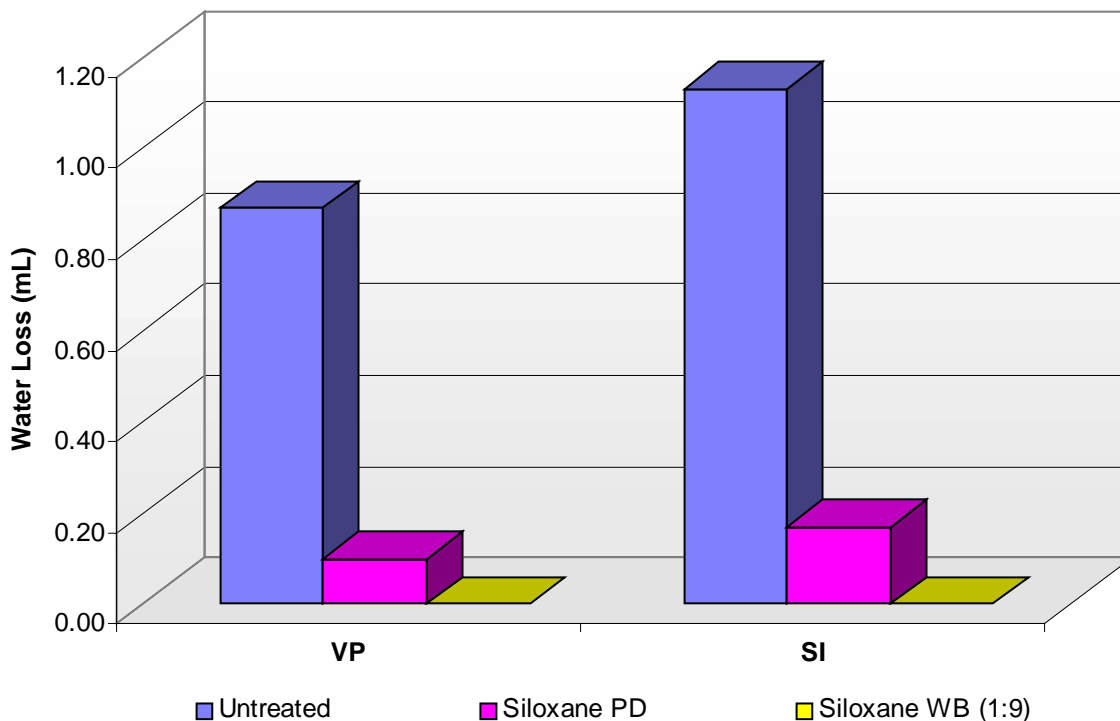
AA = Above Average

A = Average

BA = Below Average

"Village Park"	Results	Ranking
Untreated Control	.87 mL loss	---
Siloxane PD	.10 mL loss	<u>AA</u>
Siloxane WB (1:9)	0 mL loss	<u>AA</u>
"Sierra"	Results	Ranking
Untreated Control	1.13 mL loss	---
Siloxane PD	.17 mL loss	<u>AA</u>
Siloxane WB (1:9)	0 mL loss	<u>AA</u>

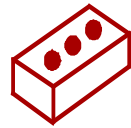
Water Absorption Tube Test:  
RILEM II.4, 5.0 milliliters, 20 minutes



Graph 2



# PALLET CARD PROGRAM LABORATORY REPORT



## Water Repellent Treatments

“Village Park”  
BEFORE



AFTER



“Sierra”  
BEFORE

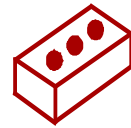


AFTER





# PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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## CONCLUSIONS - Protective Water Repellents:

Based upon laboratory evaluations, both Siloxane PD concentrate and Siloxane WB Concentrate at a 1:9 dilution exhibited above average water repellency on both submitted brick types, "Village Park" and "Sierra". The Siloxane WB Concentrate was about 10-15% more effective than the Siloxane PD. Generally a reduction of approximately 80% is required to provide resistance to water intrusion under normal exposure conditions, which was achieved on both submitted sample types using Siloxane PD concentrate and Siloxane WB concentrate at a 1:9 dilution.

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## RECOMMENDATIONS - Protective Water Repellents:

Based on test results, Sure Klean® Weather Seal Siloxane PD and Sure Klean® Weather Seal Siloxane WB Concentrate at a 1:9 dilution provided excellent water-repellent protection on both of the submitted brick types. These products are recommended for job site evaluation where these brick types are incorporated into the building's façade.

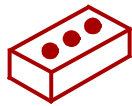
It must be pointed out that in any installation, the brick are a single component of the masonry facade. The ability of a water repellent treatment to prevent the ingress of water is affected by a variety of other factors, therefore on-site testing should be carried out for all installations with the recommended systems to ensure job site workmanship yields equivalent results.

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.

Jason L. Anderson  
Technical Analyst

JLA/csm





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***Laboratory Report***

**Pallet Card Evaluation**

**Boral Brick Company  
Marshall, TX Plant**

***Project No.*** 0011-21 PC

***Prepared For:***

**Steve Young**

**Boral Brick Company  
212 North Loop 336 East  
Conroe, TX 77301**

***Prepared By:***



***PROSOCO, Inc.***  
***January 2001***