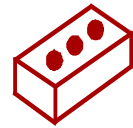




# PALLET CARD PROGRAM LABORATORY REPORT



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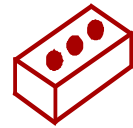
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### ATTACHMENTS

- 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



# PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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**FOR:** Paul Tessier  
cc: Jack James

**SUBJECT:** Boral Brick (Phenix City Plant)

**DATE:** December 10, 2000

**PROJECT:** 0009-17 PC

**SAMPLES SUBMITTED:**

1 sleeve of "Cambridge" (CA)  
Size: 4" x 4" x 8"

1 sleeve of "Dover" (DV)  
Size: 4" x 4" x 8"

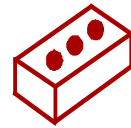
1 sleeve of "Orleans" (OR)  
Size: 4" x 4" x 8"

1 sleeve of "Normandy" (NR)  
Size: 4" x 4" x 8"

Submitted by: Paul Tessier



# PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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## PURPOSE OF TESTING:

Samples of four different types 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<sup>®</sup> 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 prepared mortar for 10 minutes. The mortar-stained brick were cured at 75% ± 5% RH and 70°F ± 5°F before any cleaning tests were attempted.

Heavy deposits of mortar are removed with dry scraping after 24 hours. Sure Klean<sup>®</sup> 600 Detergent, Sure Klean<sup>®</sup> Vana Trol<sup>®</sup>, and Sure Klean<sup>®</sup> 101 Lime Solvent were tested for removal of gray N masonry cement mortar after 7, 14 and 21 days of curing.

- B. Surface Alteration Testing** - Sure Klean<sup>®</sup> 600 Detergent, Sure Klean<sup>®</sup> Vana Trol<sup>®</sup>, and 101 Lime Solvent were 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.

Surface Finish Removal is the visual examination of the brick comparing the surface finish of the untreated control surface to the surface finish cleaned with selected product(s) at given dilutions.

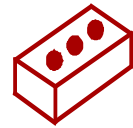
Substrate Deterioration is the visual examination of the brick comparing the surface of the untreated control to surfaces cleaned with selected product(s) at given dilutions looking for any potential erosion/digestion of the brick..

Color Change is the visual examination comparing the color of the untreated control surface to color of surfaces cleaned with selected products at given dilutions.

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



# PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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## CLEANING PRODUCTS

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

## SURFACE ALTERATIONS PRODUCTS EVALUATED

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

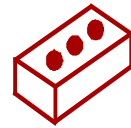
## WATER REPELLENT PRODUCTS EVALUATED

SAMPLE	Treatment	Dilution
All submitted brick samples	Siloxane WB Concentrate	1:9

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



# 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® 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® 101 Lime Solvent** - A concentrated acidic cleaner for dark-colored brick and tile surfaces with are not subject to metallic oxidation. Safely removes excess mortar and construction dirt.

### TEST METHOD – New Construction Cleaning

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

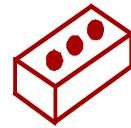
1. Prewet the surface with water.
2. Apply the cleaner.
3. Allow the appropriate dwell time, as specified.
 

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

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



# PALLET CARD PROGRAM LABORATORY REPORT



**Test Results - New Construction Cleaning**

Results are reported as % removal of mortar soiling

**“Cambridge”**

	<u>7 day</u>	<u>14 day</u>	<u>21 day</u>
600 Detergent (1:6)	100%	---	99%
600 Detergent (1:8)	100%	100%	99%
Vana Trol® (1:6)	99%	---	99%
Vana Trol® (1:8)	99%	100%	99%
101 Lime Solvent (1:6)	100%	---	99%
101 Lime Solvent (1:8)	100%	100%	99%

**“Dover”**

	<u>7 day</u>	<u>14 day</u>	<u>21 day</u>
600 Detergent (1:6)	95%	---	99%
600 Detergent (1:8)	100%	99%	95%
Vana Trol® (1:6)	99%	---	95%
Vana Trol® (1:8)	70%	100%	70%
101 Lime Solvent (1:6)	100%	---	99%
101 Lime Solvent (1:8)	100%	97%	99%

**“Orleans”**

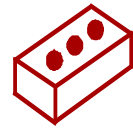
	<u>7 day</u>	<u>14 day</u>	<u>21 day</u>
600 Detergent (1:6)	100%	---	97%
600 Detergent (1:8)	95%	100%	95%
Vana Trol® (1:6)	100%	---	95%
Vana Trol® (1:8)	100%	100%	95%
101 Lime Solvent (1:6)	95%	---	100%
101 Lime Solvent (1:8)	99%	100%	100%

**“Normandy”**

	<u>7 day</u>	<u>14 day</u>	<u>21 day</u>
600 Detergent (1:6)	99%	---	95%
600 Detergent (1:8)	100%	100%	95%
Vana Trol® (1:6)	100%	---	100%
Vana Trol® (1:8)	100%	100%	100%
101 Lime Solvent (1:6)	99%	---	100%
101 Lime Solvent (1:8)	100%	100%	100%



# PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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## CONCLUSIONS - Cleaning:

Based on the test results, both 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. 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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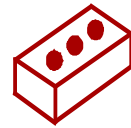
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## RECOMMENDED PRODUCTS AND DILUTIONS - CLEANING:

Sample	Sure Klean® 600 Detergent	Sure Klean® Vana Troi®	Sure Klean® 101 Lime Solvent
Cambridge	1:8	1:8	1:8
Dover	1:8	1:8	1:8
Orleans	1:8	1:8	1:8
Normandy	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® 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 Troi®** - 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® 101 Lime Solvent** - A concentrated acidic cleaner for dark-colored brick and tile surfaces with are not subject to metallic oxidation. Safely removes excess mortar and construction dirt.

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### TEST METHOD – Surface Alteration Testing:

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

Sure Klean® 600 Detergent, Sure Klean® Vana Troi®, and Sure Klean® 101 Lime Solvent were evaluated at dilutions of 1:6 and 1:8. The following procedure was used:

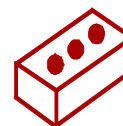
1. Prewet the surface with water.
2. Apply each cleaner at the appropriate dilutions.
3. Allow a 5-minute exposure time.
4. Reapply the products and moderately agitate with a brush.
5. Pressure rinse thoroughly.\*
6. Allow the surface to dry for at least 18 hours and visually examine.

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





# PALLET CARD PROGRAM LABORATORY REPORT



**Surface Alteration Results:**

Substrate: <b>Cambridge</b>		Substrate Color: <b>Red</b>			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
Vana Trol®	1:6	3	0	0	0
Vana Trol®	1:8	3	0	0	0
600 Detergent	1:6	3	0	0	0
600 Detergent	1:8	3	0	0	0
101 Lime Solvent	1:6	3	0	0	0
101 Lime Solvent	1:8	3	0	0	0
Substrate: <b>Dover</b>		Substrate Color: <b>Red</b>			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
Vana Trol®	1:6	4	0	0	0
Vana Trol®	1:8	4	0	0	0
600 Detergent	1:6	4	0	0	0
600 Detergent	1:8	4	0	0	0
101 Lime Solvent	1:6	4	0	0	0
101 Lime Solvent	1:8	4	0	0	0
Substrate: <b>Orleans</b>		Substrate Color: <b>Red</b>			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
Vana Trol®	1:6	0	0	0	0
Vana Trol®	1:8	0	0	0	0
600 Detergent	1:6	0	0	0	0
600 Detergent	1:8	0	0	0	0
101 Lime Solvent	1:6	0	0	0	0
101 Lime Solvent	1:8	0	0	0	0
Substrate: <b>Normandy</b>		Substrate Color: <b>Red</b>			
Product	Dilution	Surface Finish Removal	Substrate Deterioration	Color Change	Staining
Vana Trol®	1:6	3	0	0	0
Vana Trol®	1:8	3	0	0	0
600 Detergent	1:6	3	0	0	0
600 Detergent	1:8	3	0	0	0
101 Lime Solvent	1:6	3	0	0	0
101 Lime Solvent	1:8	3	0	0	0

Scale used for reporting results of all categories

0 – no change

1 – 1-24% change – slight

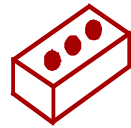
2 – 25-49% change – moderate

3 – 50-74% change – heavy

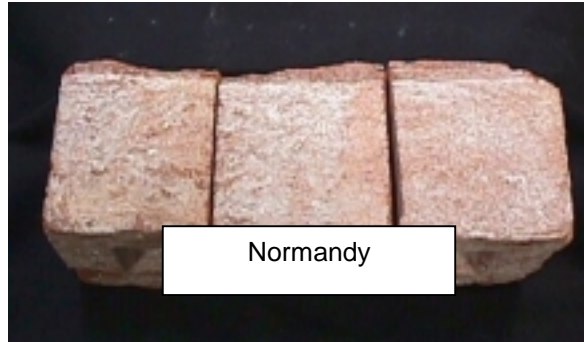
4 – 75-100% change – excessive



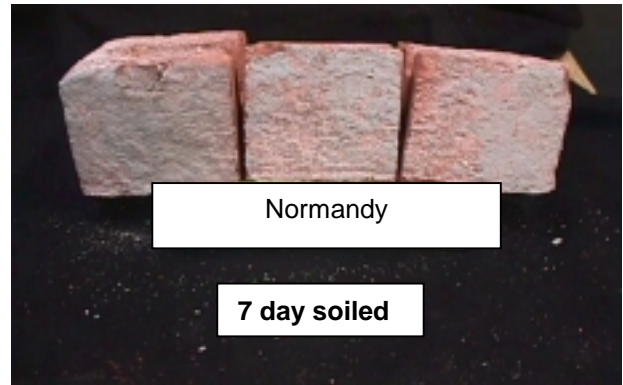
# PALLET CARD PROGRAM LABORATORY REPORT



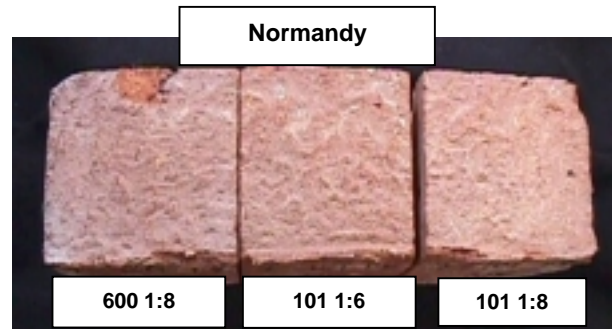
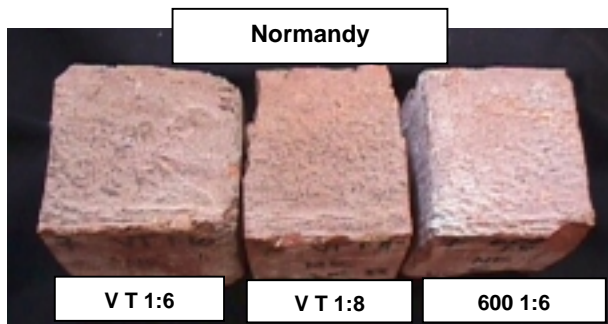
### Untreated Control



### 7 Day Mortar Soiled

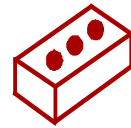


### 7 Day Cleaning





# PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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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® 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 alkoxysiloxanes 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 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 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.

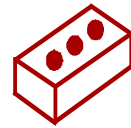
Reduced water absorption values – reported as effectiveness – measure the effectiveness of selected treatments in protecting samples from water penetration and water related decay mechanisms. Generally a reduction of approximately 80% is required to provide resistance to water intrusion under normal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



# PALLET CARD PROGRAM LABORATORY REPORT



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 ml X 20% = 1 ml.

A rating of **A** *Average* water repellent performance would require loss of no more than 5 ml X 50% = 2.5ml.

A rating of **BA** *Below Average* water repellent performance would be reported for treatments which result in a loss of more than 50% X 5ml = 2.5ml+

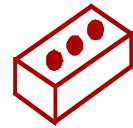
**TEST RESULTS - Protective Water Repellents:**

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

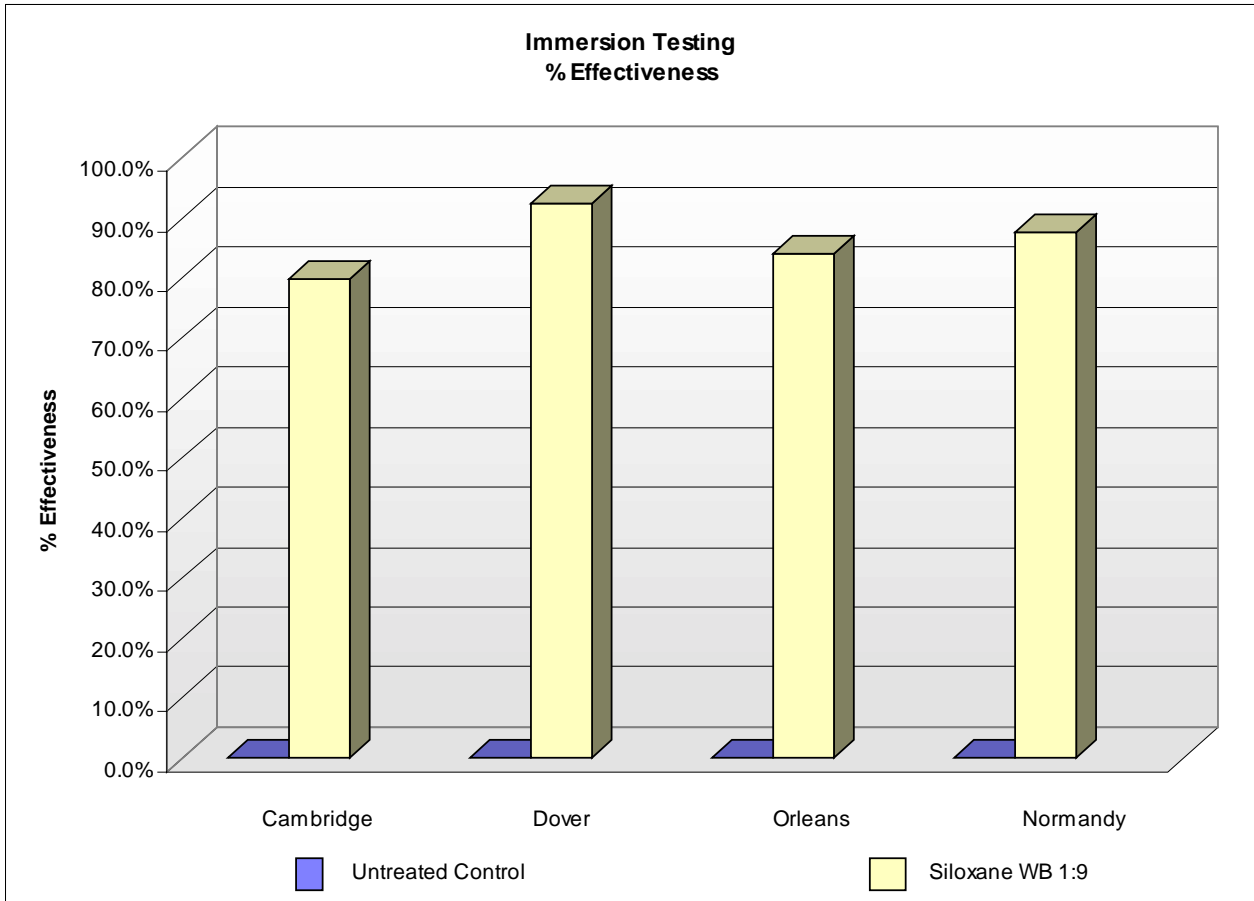
<b>"Cambridge"</b>	<b>% Absorption</b>	<b>% Effectiveness</b>
Untreated Control	7.89%	0.0%
Siloxane WB 1:9	1.59%	80.0%
<b>"Dover"</b>	<b>% Absorption</b>	<b>% Effectiveness</b>
Untreated Control	11.795	0.0%
Siloxane WB 1:9	0.80%	92.5%
<b>"Orleans"</b>	<b>% Absorption</b>	<b>% Effectiveness</b>
Untreated Control	8.52%	0.0%
Siloxane WB 1:9	1.36%	84.0%
<b>"Normandy"</b>	<b>% Absorption</b>	<b>% Effectiveness</b>
Untreated Control	9.18%	0.0%
Siloxane WB 1:9	1.14%	87.6%



# PALLET CARD PROGRAM LABORATORY REPORT



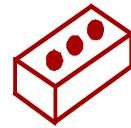
## Water Absorption: ASTM C 67, Immersion



**Graph 1**



# PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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## TEST RESULTS - Protective Water Repellents:

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

AA = Above Average

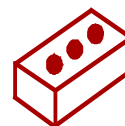
AA = Average

BA = Below Average

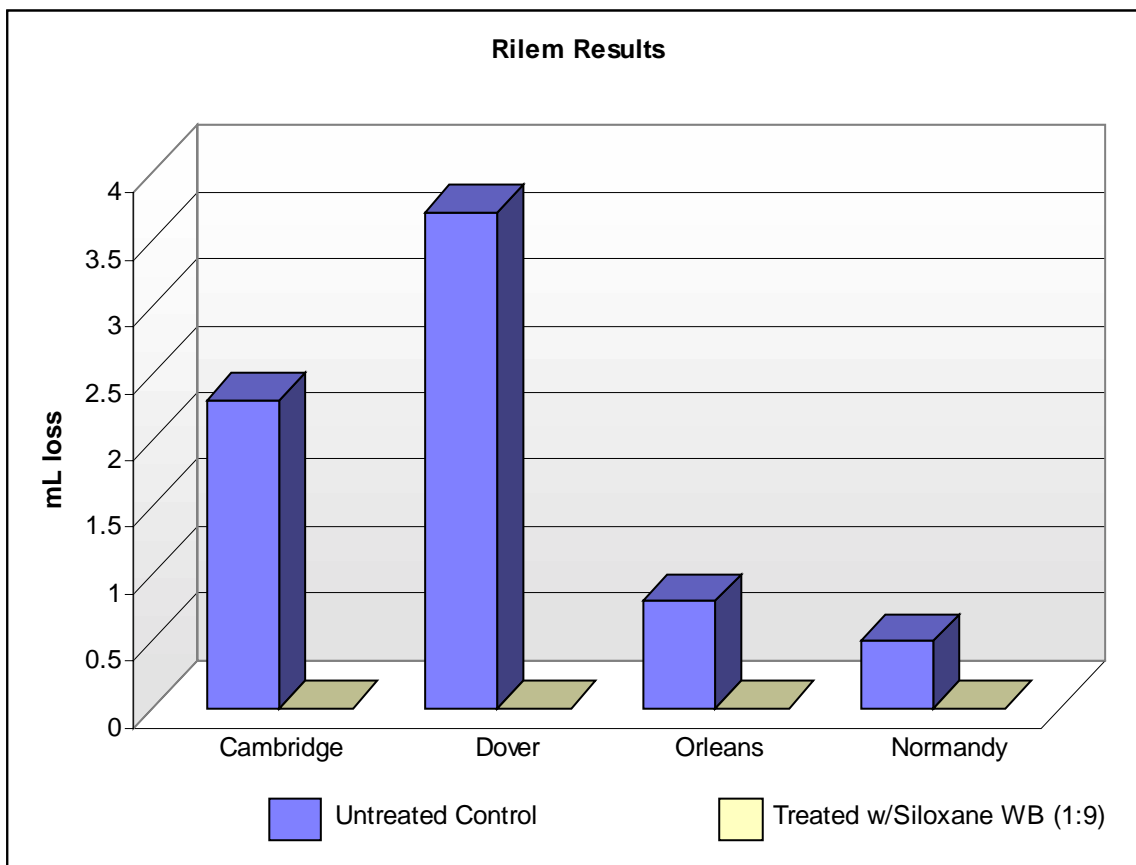
<b>"Cambridge"</b>	<b>Results</b>	<b>Ranking</b>
Untreated Control	2.3 mL loss	---
Siloxane WB 1:9	0.0 mL loss	<u>AA</u>
<b>"Dover"</b>	<b>Results</b>	<b>Ranking</b>
Untreated Control	3.7 mL loss	---
Siloxane WB 1:9	0.0 mL loss	<u>AA</u>
<b>"Orleans"</b>	<b>Results</b>	<b>Ranking</b>
Untreated Control	0.8 mL loss	--
Siloxane WB 1:9	0.0 mL loss	<u>AA</u>
<b>"Normandy"</b>	<b>Results</b>	<b>Ranking</b>
Untreated Control	0.5 mL loss	---
Siloxane WB 1:9	0.0 mL loss	<u>AA</u>



# PALLET CARD PROGRAM LABORATORY REPORT



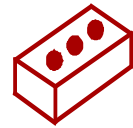
Water Absorption Tube Test:  
RILEM II.4, 5.0 milliliters, 20 minutes



**Graph 2**



# PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

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## CONCLUSIONS - Protective Water Repellents:

Based upon laboratory evaluations, Sure Klean<sup>®</sup> Weather Seal Siloxane WB Concentrate, diluted with 9 parts water, provided above average water repellency to the submitted brick. The results of the ASTM C 67 immersion test clearly demonstrates the benefits of utilizing PROSOCO's Sure Klean<sup>®</sup> Weather Seal Siloxane WB Concentrate water repellent on these particular bricks manufactured by Boral Brick in Phenix City, Alabama.

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## RECOMMENDATIONS - Protective Water Repellents:

Based on test results, Sure Klean<sup>®</sup> Weather Seal Siloxane WB Concentrate, diluted with 9 parts water, can be recommended for job-site testing to provide water repellency on all four types of brick.

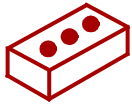
It must be pointed out that in any installation, the brick are a single component of the masonry facade. The ability of a water repellent treatment to prevent the ingress of water is affected by a variety of other factors, therefore on-site testing should be carried out for all installations with the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

Carmen M. Hupp  
Technical Analyst

CMH/csm





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**Laboratory Report**

**Pallet Card Evaluation**

**Boral Brick  
Phenix City Plant  
Phenix City, AL**

**Project No. 0009-17 PC**

**Prepared For:**

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

**Prepared By:**



**PROSOCO, Inc.**  
**December 2000**