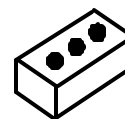




PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 1

TABLE OF CONTENTS

SAMPLES SUBMITTED	3
PURPOSE OF TEST	4
PRODUCTS EVALUATED.....	5

SECTION A – PROTECTIVE WATER REPELLENTS

DESCRIPTION OF PRODUCTS EVALUATED.....	6
TEST METHODS.....	6-7
TEST RESULTS.....	7
CONCLUSIONS	8
RECOMMENDATIONS	8

SECTION B – PROTECTIVE STAIN REPELLENTS

DESCRIPTION OF PRODUCTS EVALUATED.....	9
TEST METHOD.....	9
TEST RESULTS.....	10-11
CONCLUSIONS	11
RECOMMENDATIONS	11

SECTION C – SLIP RESISTANCE

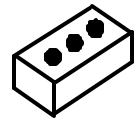
DESCRIPTION OF PRODUCTS EVALUATED.....	12
TEST METHOD.....	12
TEST RESULTS.....	13
CONCLUSIONS	13
RECOMMENDATIONS	13

SECTION D – WATER VAPOR TRANSMISSION

DESCRIPTION OF PRODUCTS EVALUATED.....	14
TEST METHODS.....	14
TEST RESULTS.....	15
CONCLUSIONS	15
RECOMMENDATIONS	15



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 2

SECTION E – CHLORIDE ION INTRUSION

DESCRIPTION OF PRODUCTS EVALUATED.....	16
TEST METHOD.....	16
TEST RESULTS.....	17
CONCLUSIONS.....	17
RECOMMENDATIONS.....	17

SECTION F – ACID & WATER SOLUBILITY

TEST METHOD.....	18
TEST RESULTS.....	19
CONCLUSIONS.....	19

ATTACHMENTS

Attachment #1 – GRAPH A & PHOTO A

Attachment #2 – GRAPH B & C

Attachment #3 – GRAPH D & E

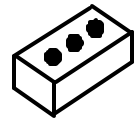
ASTM C 67 Immersion Testing

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

Product Data literature for all products evaluated



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 3

FOR: CLIENT
cc: Perry Surber
John Bourne
Mike Dickey

SUBJECT: Cleveland Quarries
Amherst, OH

DATE: November 13, 2001

PROJECT: 0106-29 PC

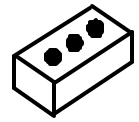
SAMPLES SUBMITTED:

Sample	Color/Finish	Size
(8) Sandstone tiles	"Amherst gray"	4" x 4" x 1/2"
(8) Sandstone tiles	"Birmingham buff"	4" x 4" x 1/2"
(1) Sandstone tile	"Amherst gray"	12" x 12" x 2"
(1) Sandstone tile	"Birmingham buff"	12" x 12" x 2"

Submitted by: Perry Surber



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 4

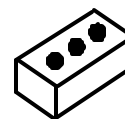
PURPOSE OF TESTING:

18 samples of sandstone in two different colors were submitted to PROSOCO, Inc.'s Testing Laboratory with a request to determine water repellency, stain repellency, slip resistance, water vapor transmission, and salt erosion with various PROSOCO products. Also an acid and water solubility test was done in comparison to limestone.

- A. Protective Water Repellents** – Sure Klean[®] Weather Seal Natural Stone Treatment WB (NST WB) and Stand Off[®] Limestone & Marble Protector (LMP) were evaluated for their ability to provide water repellency to the submitted sandstone samples.
- B. Protective Stain Repellents** – Stand Off[®] SLX100 Water & Oil Repellent was evaluated on the submitted samples for its ability to provide stain repellency.
- C. Slip Resistance** – Stand Off[®] SLX100 Water & Oil Repellent was tested for its effects on the coefficient of friction of the submitted sandstone samples.
- D. Water Vapor Transmission** – Sure Klean[®] Weather Seal Natural Stone Treatment (NST), Sure Klean[®] Weather Seal Siloxane PD, and Sure Klean[®] Weather Seal Siloxane WB Concentrate were evaluated on the submitted samples for their ability to provide water repellency.
- E. Chloride Ion Intrusion** – Sure Klean[®] Weather Seal Natural Stone Treatment (NST), Sure Klean[®] Weather Seal Siloxane PD, and Sure Klean[®] Weather Seal Siloxane WB Concentrate were tested for their resistance to water and salt intrusion.
- F. Acid & Water Solubility** – Untreated samples of sandstone were tested for their solubility in 10% hydrochloric acid and distilled water in comparison with limestone.



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 5

WATER REPELLENT PRODUCTS EVALUATED

SAMPLE	PRODUCT
Both colors of sandstone	Sure Klean [®] Weather Seal Natural Stone Treatment WB
	Stand Off [®] Limestone & Marble Protector

STAIN REPELLENT PRODUCTS EVALUATED

SAMPLE	PRODUCT
Both colors of sandstone	Stand Off [®] SLX100 Water & Oil Repellent

SLIP RESISTANCE PRODUCTS EVALUATED

SAMPLE	PRODUCT
Both colors of sandstone	Stand Off [®] SLX100 Water & Oil Repellent

WATER VAPOR TRANSMISSION PRODUCTS EVALUATED

SAMPLE	PRODUCT	DILUTION
Both colors of sandstone	Sure Klean [®] Weather Seal Natural Stone Treatment	Concentrate
	Sure Klean [®] Weather Seal Siloxane PD	Concentrate
	Sure Klean [®] Weather Seal Siloxane WB Concentrate	1:9

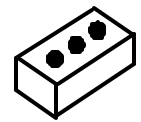
CHLORIDE ION INTRUSION PRODUCTS EVALUATED

SAMPLE	PRODUCT	DILUTION
Both colors of sandstone	Sure Klean [®] Weather Seal Natural Stone Treatment (NST)	Concentrate
	Sure Klean [®] Weather Seal Siloxane PD	Concentrate
	Sure Klean [®] Weather Seal Siloxane WB Concentrate	1:9

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



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 6

SECTION A – 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® Weather Seal Natural Stone Treatment WB – An odorless, water-based solution of potassium methyl silicate developed to effectively treat a wide range of natural stone and masonry surfaces. Natural Stone Treatment WB provides long-lasting repellency without altering the natural appearance of the substrate.

Stand Off® Limestone & Marble Protector – A clear penetrating water and oil repellent suitable for use on interior or exterior calcareous surfaces such as limestone, marble and travertine. It's also suitable for sandstone, granite and slate, and many other types of masonry surfaces. Stand Off® Limestone & Marble protector penetrates deeply to provide surface and subsurface protection without forming a glossy surface film. Treated surfaces retain their natural color, texture and appearance.

SAMPLE PREPARATION – Protective Water Repellents

The submitted samples were cleaned, allowed to dry, and to reabsorb atmospheric humidity for 24 hours prior to treatment. The treatment method consisted of a single 20 second saturating immersion. All treatments were allowed to cure at least 72 hours prior to testing.

TEST METHODS – Protective Water Repellents

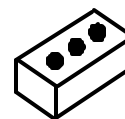
Water Absorption: ASTM C97, Immersion

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, 4-hour, and 24-hour intervals. See ASTM C97 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.



PALLET CARD PROGRAM LABORATORY REPORT



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.

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 C97, Immersion

"Amherst Gray"	% Absorption	% Effectiveness
Untreated Control	4.96%	--
NST WB	0.90%	81.9%
LMP	0.22%	95.6%
"Birmingham Buff"	% Absorption	% Effectiveness
Untreated Control	5.98%	--
NST WB	0.96%	83.9%
LMP	0.22%	96.3%

TEST RESULTS – Protective Water Repellents

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

AA = Above Average

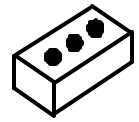
AA = Average

BA = Below Average

"Amherst Gray"	Results	Ranking
Untreated Control	>5.0 mL loss	---
NST WB	0.0 mL loss	AA
LMP	0.0 mL loss	AA
"Birmingham Buff"	Results	Ranking
Untreated Control	>5.0 mL loss	---
NST WB	0.0 mL loss	AA
LMP	0.0 mL loss	AA



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 8

CONCLUSIONS – Protective Water Repellents:

Based upon laboratory evaluations, Sure Klean® Weather Seal Natural Stone Treatment WB and Stand Off® Limestone & Marble Protector exhibited above average water repellency on both colors of the submitted sandstone. Generally, a reduction of approximately 80% is required to provide resistance to water intrusion under normal exposure conditions.

NOTE: Refer to Attachment #1 “GRAPH A”.

RECOMMENDATIONS – Protective Water Repellents:

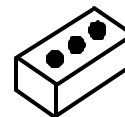
Based on test results, Sure Klean® Weather Seal Siloxane Natural Stone Treatment WB and Stand Off® Limestone & Marble Protector provided excellent water-repellent protection on both colors of sandstone tile submitted by Cleveland Quarries, Amherst, OH, and are recommended for job-site evaluation.

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.



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 9

SECTION B – PROTECTIVE STAIN REPELLENTS

The testing described below evaluates the suitability of stain protection treatments.

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

1. Ease of application
2. Color change
3. Removal of staining substances

DESCRIPTIONS OF PRODUCTS EVALUATED – Protective Stain Repellents

Stand Off[®] SLX100 Water & Oil Repellent – Combines water and oil repellency to prevent staining by waterborne or oily substances and many types of graffiti. This modified “neat” silane system offers invisible protection and low volatility.

Products Evaluated for Stain Removal:

Stand Off[®] All Surface Cleaner – Dilution: 1 part concentrate : 10 parts water

Food and Oil Products Evaluated:

Coca-Cola [®]	(~75°F)
Red Wine	(~75°F)
Balsamic Vinegar	(~75°F)
Mustard	(~75°F)
Coffee	(~120°F)
Vegetable Oil	(~250°F)

SAMPLE PREPARATION – Protective Stain Repellents

The submitted tiles were cleaned, allowed to dry, and to reabsorb atmospheric humidity for 24 hours prior to treatment. The treatment method consisted of a single saturating brush application. The treatment was then allowed to cure at least 72 hours prior to testing.

TEST METHODS – Protective Stain Repellents

Surface Beading Evaluation

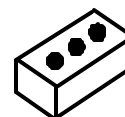
The food and oil products were applied to the test areas. The beading properties of the oils and liquids were visually evaluated within two minutes after application. The results are reported as a rating based on the angle of contact between the base of the droplet and the substrate. A rating of “1 or 2” indicates the smallest angle of contact (<90°) which correlates to “above average” repellency. A rating of “3 or 4” indicates “average” repellency. A rating of “5 or greater” indicates that the oil quickly absorbed into the substrate and correlates to “below average” repellency.

Stain Resistance

The soiling agents were allowed to dwell on the treated and untreated substrate for times of 24 hours, 7 hours, 4 hours, and 1 hour. The test areas were then cleaned with Stand Off[®] All Surface Cleaner diluted 1 part concentrate to 10 parts fresh water and scrubbed under a stream of running water from a faucet. Samples were allowed to dry for 24 hours. Evaluation consisted of a visual examination of the tested areas to determine the percentage of staining removal.



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 10

TEST RESULTS – Surface Beading

“Amherst Gray” Sandstone Tile					
Coca-Cola®	Red Wine	Balsamic Vinegar	Mustard	Coffee	Vegetable Oil
Untreated Control					
5	5	5	N/A	5	5
SLX100					
1	2	2	N/A	3	3
“Birmingham Buff” Sandstone Tile					
Coca-Cola®	Red Wine	Balsamic Vinegar	Mustard	Coffee	Vegetable Oil
Untreated Control					
5	5	5	N/A	5	5
SLX100					
1	2	2	N/A	3	3

N/A – This substance is not a free-flowing liquid

Rating System: 1 & 2 Above Average
 3 & 4 Average
 5 Below Average

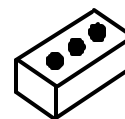
TEST RESULTS – Stain Resistance

“Amherst Gray” Sandstone Tile						
	Coca-Cola®	Red Wine	Balsamic Vinegar	Mustard	Coffee	Vegetable Oil
Untreated Control						
24hr	98%	90%	87%	80%	20%	10%
7hr	98%	90%	87%	90%	20%	10%
4hr	98%	90%	87%	90%	20%	10%
1hr	98%	90%	87%	90%	20%	10%
SLX100						
24hr	100%	100%	100%	100%	100%	90%
7hr	100%	100%	100%	100%	100%	90%
3hr	100%	100%	100%	100%	100%	90%
1hr	100%	100%	100%	100%	100%	90%

% Removal of stain following maintenance cleaning.



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 11

TEST RESULTS – Stain Resistance Continued

"Birmingham Buff" Sandstone Tile						
	Coca-Cola®	Red Wine	Balsamic Vinegar	Mustard	Coffee	Vegetable Oil
Untreated Control						
24hr	98%	98%	90%	87%	98%	0%
7hr	98%	98%	90%	87%	98%	0%
4hr	98%	98%	90%	87%	98%	0%
1hr	98%	98%	90%	87%	98%	0%
SLX100						
24hr	100%	100%	100%	100%	100%	90%
7hr	100%	100%	100%	100%	100%	90%
3hr	100%	100%	100%	100%	100%	90%
1hr	100%	100%	100%	100%	100%	90%

% Removal of stain following maintenance cleaning.

CONCLUSION – Protective Stain Repellents

Based on laboratory evaluations, Stand Off® SLX100 Water & Oil Repellent performed extremely well at protecting the tiles from the staining agents. Not only did it protect the surface from staining but it exhibited excellent beading characteristics as well.

NOTE: Refer to Attachment #1 "PHOTO A".

RECOMMENDATION – Protective Stain Repellents

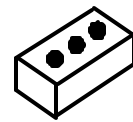
Based on test results, Stand Off® SLX100 Water & Oil Repellent can be recommended for use on the two colors of sandstone tiles submitted by Cleveland Quarries, Amherst, OH.

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 stain repellent and procedures for a particular project.

See product literature for additional application and product information.



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 12

SECTION C – SLIP RESISTANCE

DESCRIPTION OF PRODUCTS EVALUATED – Slip Resistance

Stand Off® SLX100 Water & Oil Repellent – Combines water and oil repellency to prevent staining by waterborne or oily substances and many types of graffiti. This modified “neat” silane system offers invisible protection and low volatility.

SAMPLE PREPARATION – Protective Stain Repellents

The submitted tiles were cleaned, allowed to dry, and to reabsorb atmospheric humidity for 24 hours prior to treatment. The treatment method consisted of a single saturating brush application. The treatment was then allowed to cure at least 72 hours prior to testing.

TEST METHOD – Slip Resistance

The samples were tested for wet and dry static coefficient of friction using procedures and materials in accordance with ASTM C 1028.

Calibration

A 50-lb weight with a neolite heel attached on the bottom of the assembly was placed on the standard tile. Using a dynamometer the force required to set the heel assembly into motion was recorded.

A total of four pulls were made with each pull being perpendicular to the previous pull. The following equation was used to determine the calibration factors. The calibration procedure was repeated for both a dry and wet surface.

Equation for Dry Surface

$$X_D = 0.71 - \frac{R}{NW}$$

Equation for Wet Surface

$$X_W = 0.47 - \frac{R}{NW}$$

Where:

- X_D = Dry Calibration Factor
- X_W = Wet Calibration Factor
- R = Sum of the recorded pulls
- N = Number of pulls
- W = Weight of the neolite heel assembly

Testing – Dry and Wet

A 50-lb weight assembly with a neolite heel attached on the bottom of the assembly was placed on top of the tile to be tested. Using a dynamometer the force required to set the test assembly in motion was measured.

Four pulls, each perpendicular to the previous pull, on three different surfaces were measured to give a total of twelve measurements. The following equations were used to determine the static coefficient of friction. The tests were run on both a wet and dry surface.

Equation for Dry Surface

$$F_D = \frac{R}{NW} + X_D$$

Equation for Wet Surface

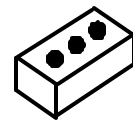
$$F_W = \frac{R}{NW} + X_W$$

Where:

- F_D = Static Coefficient of Friction for Dry Surface
- F_W = Static Coefficient of Friction for Wet Surface
- R = Sum of the 12 force readings
- N = Number of Pulls (12)
- W = Total Weight of the Neolite Heel Assembly



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 13

TEST RESULTS – Slip Resistance

Sample	DRY	
	X _D UC	X _D SLX100
Standard Tile	0.096	0.081

Sample	WET	
	X _w UC	X _w SLX100
Standard Tile	-0.135	-0.169

Sample	DRY SCOF	WET SCOF
“Amherst Gray” UC	1.011	0.713
“Amherst Gray” SLX100	0.915	0.694
“Birmingham Buff” UC	0.985	0.697
“Birmingham Buff” SLX100	0.925	0.681

Current ADA regulations suggest that horizontal surfaces have a static coefficient of friction (SCOF) of 0.6 or greater and a ramped surface have a static coefficient of friction of 0.8 or greater. It should be noted that the larger the SCOF the more resistant the surface is to slipping.

CONCLUSIONS – Slip Resistance

In the tests conducted on the submitted sandstone samples treated with Stand Off[®] SLX100 Water & Oil Repellent, results show that slip resistance of treated surfaces are similar to the slip resistance of the untreated control. The treated surfaces show slight drops in the SCOF, but all values remain above the ADA suggested SCOF of 0.6 for a horizontal surface. Only the dry sandstone samples received values above the ADA recommended SCOF value of 0.8 for a ramped surface. No other sample received a value within the ramped surface guidelines.

NOTE: Refer to Attachment #2 “GRAPH B”.

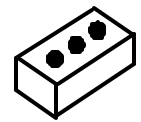
RECOMMENDATIONS – Slip Resistance

Based on test data recorded from the ASTM C 1028 certified procedures it is recommended that Stand Off[®] SLX100 Water & Oil Repellent can be applied to the sandstone tiles submitted by Cleveland Quarries, Amherst, OH.

To a clean and dry surface, apply in a single saturating application. See product literature for additional application and product information. Coverage rates and application procedures should be confirmed by field test applications.



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 14

SECTION D – WATER VAPOR TRANSMISSION

The testing described below evaluates the water vapor transmission and breathability 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 – Water Vapor Transmission

Sure Klean® Weather Seal Natural Stone Treatment – A modified siloxane water repellent developed for limestone, marble and most other traditional masonry surfaces. Natural Stone Treatment penetrates deeply to provide long-lasting protection without altering the natural appearance of the substrate.

Sure Klean® Weather Seal Siloxane PD – A low odor, alkaline stable, water-based blend of silanes and oligomeric alkoxysiloxanes. 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® 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 which is ideal for application to either dense or porous masonry surfaces.

SAMPLE PREPARATION – Water Vapor Transmission

The submitted tiles 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.

TEST METHODS – Water Vapor Transmission

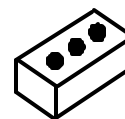
Water Vapor Transmission Test ASTM E 96 - Water Method, modified for limited samples size

Treated and untreated masonry samples were placed on laboratory test cells partially filled with water. The sides of each masonry sample were then sealed so that only the treated (or untreated) surface of the sample remained exposed. The cells were then placed in a climatic room maintained at 73°F (23°C) and 50% relative humidity and allowed to equilibrate for one week prior to any data collection.

The cells were weighed after the equilibration period and daily thereafter for a total of nine days. The total weight loss of the individual cells was calculated on a daily basis. The water vapor transmission rate was then calculated as the grams of water lost per square meter of exposed surface per 24-hour period ($\text{g/m}^2/24$ hours). The water vapor transmission rate of treated and untreated samples was then compared to determine for each treatment the retention in water vapor transmission.



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 15

TEST RESULTS – Water Vapor Transmission

Water Vapor Transmission Test ASTM E 96 - Water Method, modified for limited samples size

Amherst Gray

Treatment	Water Vapor Transmission Rate (g/m ² /24 hours)	% Breathability
Untreated Control	60.77	--
NST	39.65	65.25%
Siloxane PD	51.44	84.64%
Siloxane WB (1:9)	45.64	75.11%

Birmingham Buff

Treatment	Water Vapor Transmission Rate (g/m ² /24 hours)	% Breathability
Untreated Control	73.37	--
NST	51.13	69.69%
Siloxane PD	57.94	78.96%
Siloxane WB (1:9)	56.85	77.49%

CONCLUSIONS – Water Vapor Transmission

The above results demonstrate that the PROSOCO water repellents allow water vapor through the substrate, while protecting it from penetrating water on the exterior. Sure Klean[®] Weather Seal Siloxane PD allowed for nearly 80% of the water vapor transmission to occur through the treated surfaces. Samples treated with Sure Klean[®] Weather Seal Siloxane WB Concentrate diluted with nine parts fresh water maintained a breathability of approximately 75%. Sure Klean[®] Weather Seal Natural Stone Treatment had the lowest breathability of approximately 67%.

NOTE: Refer to Attachment #2 "GRAPH C".

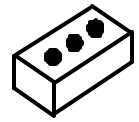
RECOMMENDATIONS – Water Vapor Transmission

Based on the test results, all of the treatments tested can be recommended for water repellency protection. Sure Klean[®] Weather Seal Siloxane PD provides the best breathability followed by Sure Klean[®] Weather Seal Siloxane WB Concentrate diluted with nine parts fresh water and Sure Klean[®] Weather Seal Natural Stone Treatment.

To a clean, dry surface apply in a wet-on-wet saturating application. See product literature for additional application and product information. Coverage rates and application procedures should be confirmed by field test applications.



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 16

SECTION E – CHLORIDE ION INTRUSION

The testing described below evaluates the suitability of water repellent treatments to resist water and salt intrusion.

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 – Chloride Ion Intrusion

Sure Klean® Weather Seal Natural Stone Treatment – A modified siloxane water repellent developed for limestone, marble and most other traditional masonry surfaces. Natural Stone Treatment penetrates deeply to provide long-lasting protection without altering the natural appearance of the substrate.

Sure Klean® 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® 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 ideal for application to dense or porous masonry surfaces.

SAMPLE PREPARATION – Chloride Ion Intrusion

The submitted sandstone tiles were cut, allowed to dry, and 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 in between, simulating a wet-on-wet application. All treatments were allowed to cure at least 14 days prior to testing.

TEST METHODS – Chloride Ion Intrusion

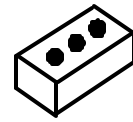
Modified NCHRP Series 1 – Chloride Ion Intrusion (24 hours)

The objective of the testing is to determine the water and chloride absorption for a treated masonry surface when soaked in a 15% salt-water solution for 24 hours. Triplicate samples were used for each treatment plus triplicate untreated control samples. Samples were evaluated at 10 minutes, 30 minutes, 60 minutes, 4 hours, and 24 hours.

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



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 17

TEST RESULTS – Chloride Ion Intrusion

Modified NCHRP Series 1 – Chloride Ion Intrusion (24 hours)

“Amherst Gray”	% Absorption	% Effectiveness
Untreated Control	5.14%	--
NST	0.08%	98.5%
Siloxane PD	4.70%	8.7%
Siloxane WB (1:9)	0.17%	96.6%
“Birmingham Buff”	% Absorption	% Effectiveness
Untreated Control	6.17%	--
NST	0.09%	98.6%
Siloxane PD	2.30%	62.7%
Siloxane WB (1:9)	0.22%	96.4%

CONCLUSIONS – Chloride Ion Intrusion

Based upon laboratory evaluations, Sure Klean® Weather Seal Natural Stone Treatment and Sure Klean® Weather Seal Siloxane WB Concentrate diluted with nine parts water were able to withstand salt erosion as shown by the immersion results. Generally, a reduction of approximately 80% is required to provide resistance to water and chloride intrusion under normal exposure conditions. Sure Klean® Weather Seal Siloxane PD Concentrate was unable to achieve this percentage in either color of the sandstone samples.

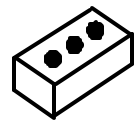
NOTE: Refer to Attachment #3 “GRAPH D”.

RECOMMENDATIONS – Chloride Ion Intrusion

Based on test results, Sure Klean® Weather Seal Siloxane Natural Stone Treatment and Sure Klean® Weather Seal Siloxane WB Concentrate diluted with nine parts water provided excellent resistance to chloride intrusion on both types of sandstone tile submitted by Cleveland Quarries, Amherst, OH, and are recommended for job-site evaluation.



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 18

SECTION F – ACID & WATER SOLUBILITY

The testing described below evaluates the solubility of sandstone in acid and water compared to a standard Indiana limestone.

TEST METHODS – Acid & Water Solubility

Acid Solubility

Approximately two grams of each sample were finely crushed, dried, and mixed with 10% by weight HCl acid solution. Each sample was allowed to stand for 24 hours. After 24 hours the solutions were filtered and the precipitate weighed. The following equation is used to calculate % Acid Solubility.

$$\% \text{ Acid Solubility} = 1 - \frac{(C - B)}{A} \times 100$$

A = initial sample weight

B = initial filter weight

C = filter with precipitate

10% or greater acid solubility indicates that the sample is composed of acid-soluble materials resulting in greater vulnerability to surface reduction and deterioration caused by acidic precipitation.

Water Solubility

Approximately two grams of each sample were finely crushed, dried, and mixed with distilled water. Each sample was allowed to stand for 24 hours. After 24 hours the solutions were filtered and the precipitate weighed. The following equation is used to calculate % Water Solubility.

$$\% \text{ Water Solubility} = 1 - \frac{(C - B)}{A} \times 100$$

A = initial sample weight

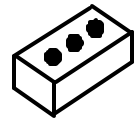
B = initial filter weight

C = filter with precipitate

10% or greater water solubility indicates that the sample is composed of water-soluble materials, which may reduce its resistance to weathering and/or represent a high concentration of water-soluble salts.



PALLET CARD PROGRAM LABORATORY REPORT



PROSOCO, Inc.

Page 19

TEST RESULTS – Acid & Water Solubility

SAMPLE	% Acid Solubility	% Water Solubility
“Amherst Gray” Ohio sandstone	4.95%	1.46%
“Birmingham Buff” Ohio sandstone	3.47%	1.49%
“Gray” Indiana limestone (standard)	100.00%	1.99%

CONCLUSIONS – Acid & Water Solubility

Based upon laboratory evaluations, both colors of Ohio sandstone are not considered acid or water-soluble. As seen here, limestone is highly acid soluble but its water solubility is nearly equal to sandstone. This would suggest that the submitted sandstone samples would be more durable than limestone in areas of high acidic precipitation if not treated with a water repellent.

NOTE: Refer to Attachment #3 “GRAPH E”.

Jason L. Anderson
Materials Testing Technician

JLA/



PROSOCO, Inc.

Attachment #1

GRAPH A – Protective Water Repellents

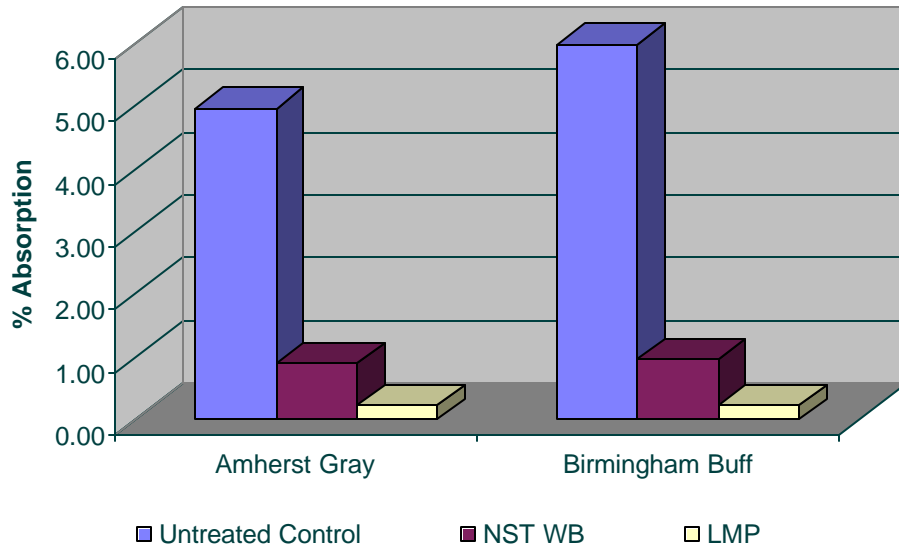
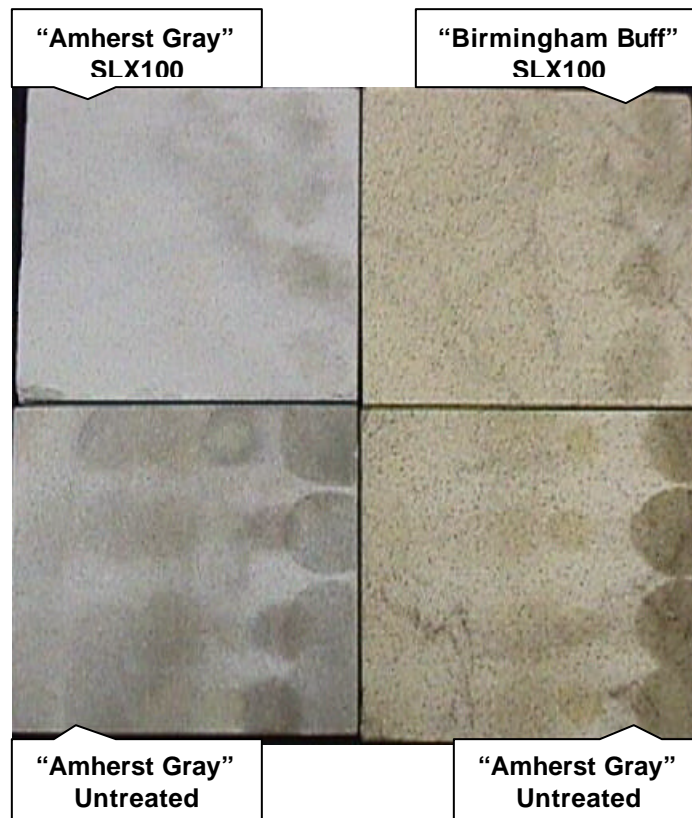


PHOTO A – Protective Stain Repellents

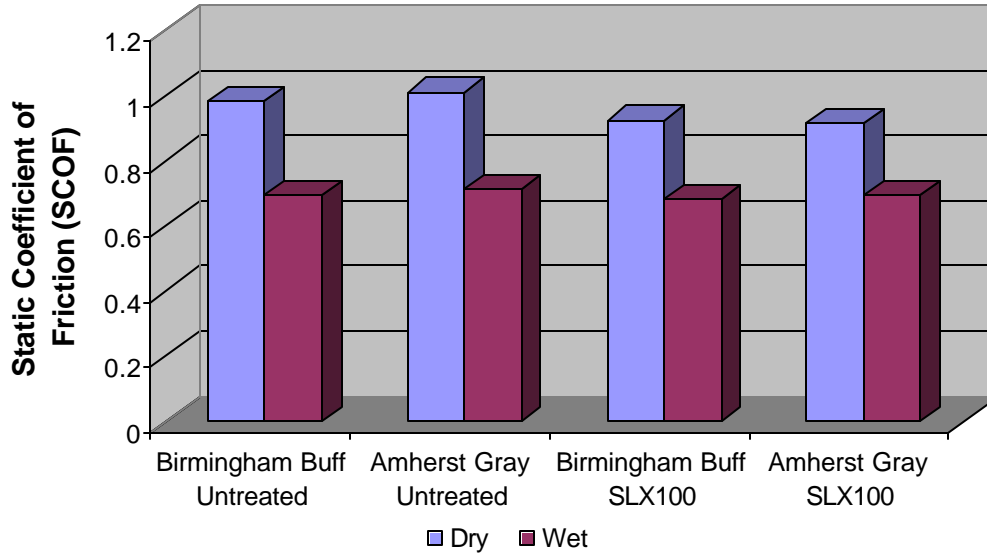




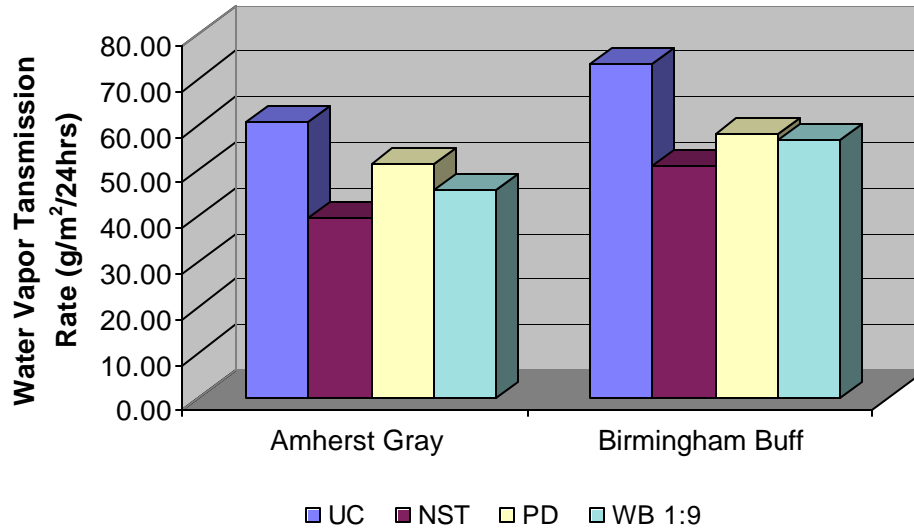
PROSOCO, Inc.

Attachment #2

GRAPH B – Slip Resistance



GRAPH C – Water Vapor Transmission

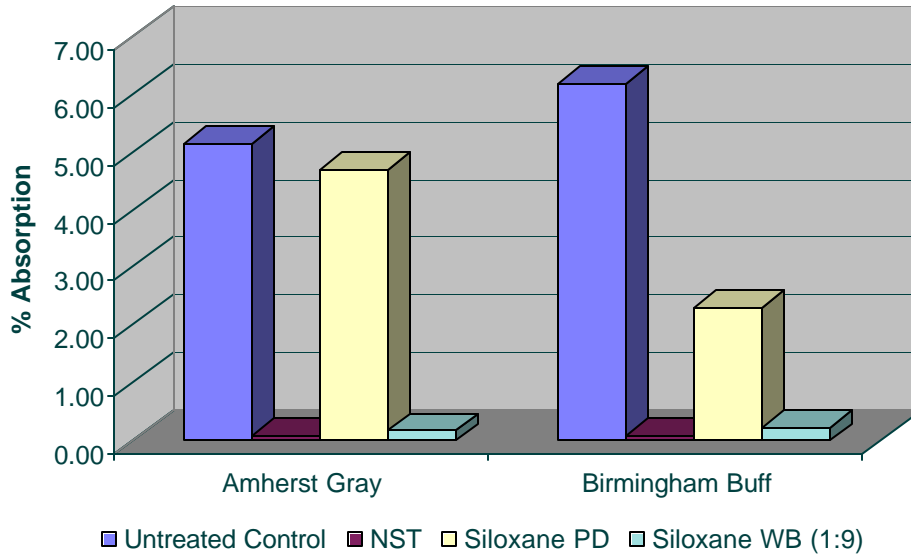




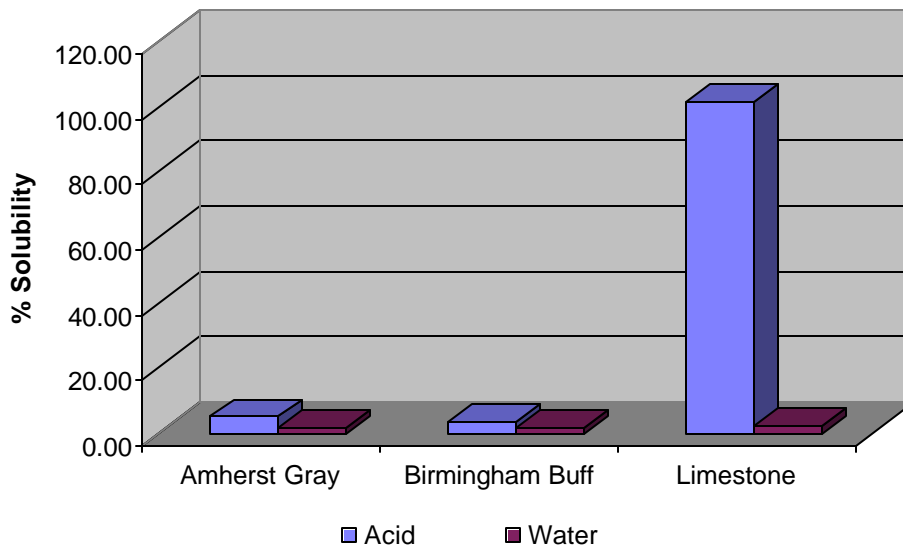
PROSOCO, Inc.

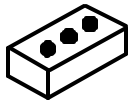
Attachment #3

GRAPH D – Chloride Ion Intrusion



GRAPH E – Acid & Water Solubility





Laboratory Report

Pallet Card Evaluation

**Cleveland Quarries
Amherst, OH**

Project No. 0106-29 PC

Prepared For:

Chris Foisy

**Cleveland Quarries
St. Rt. 113
P.O. Box 261
Amherst, OH 44001**

Prepared By:



***PROSOCO, Inc.
November 2001***