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**Attachments**

    Technical Services TECH Note RILEM Tube Test Procedures

    Product Data literature for all products evaluated

**Submitted Information**

**For:** Terry Tomlinson  
Brian Koenings

**Subject:** Select Cast Series  
American Canyon, CA

**Date:** July 6, 2007

**Project:** 0705-10 PTP

**Samples Submitted:** 4 types of "Select Cast Series" cast stone wall caps

<b>Sample</b>	<b>Color</b>	<b>Size</b>
"Shell"	White	18" X 18" X 1¼"
"Auburn"	Rust	18" X 18" X 1¼"
"Summit"	Brown	18" X 18" X 1¼"
"Normandy"	Normandy	18" X 18" X 1¼"

Submitted by: Terry Tomlinson

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## **Introduction**

Architectural Materials Testing (AMT) Laboratories is a Boyer Industries company that provides laboratory testing and consulting services for the construction industry. Laboratory testing includes evaluating chemical cleaning products and protective treatments for a variety of new and existing architectural materials.

This report includes descriptions of the PROSOCO, Inc. products and test methods that were used. Following test results and conclusions, the report provides recommendations for the most effective products and procedures.

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## **Purpose of Testing**

Four types of cast stone wall caps were submitted to AMT Laboratories by PROSOCO, Inc. with a request to determine the optimal concentration of cleaner for removal of laboratory applied mortar while leaving the external surface looking most like the uncleaned surface of the cast stone wall cap during new construction operations. Additionally, the effectiveness of water repellents suitable for cast stone wall caps was evaluated.

**New Construction Cleaning** – Sure Klean® Burnished Custom Masonry Cleaner was evaluated at various dilutions to determine the optimal concentration of cleaner for removal of laboratory applied mortar while leaving the external surface looking most like the uncleaned surface of the cast stone wall caps during new construction operations.

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

Heavy deposits of mortar were removed with dry scraping after 24 hours. Prepared cleaning solutions were then evaluated for their effectiveness in removing residual Type S mortar staining after 3, 7 and 14 days.

Color uniformity was evaluated by comparing aggregate exposure and surface pigment alternation/removal of each cleaned surface compared to the uncleaned surface of the cast stone wall caps.

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

Surface Pigment Alteration/Removal is the visual examination comparing the pigmentation of the exterior, uncleaned surface of the cast stone wall caps to surfaces cleaned with selected product(s) at given dilutions.

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

- |   |  |
|---|--|
| 0 – <b>Worst</b> match to uncleaned surface | 3 – <b>Good</b> match to uncleaned surface |
| 1 – <b>Poor</b> match to uncleaned surface  | 4 – <b>Best</b> match to uncleaned surface |
| 2 – <b>Fair</b> match to uncleaned surface  |  |

**Protective Water Repellents** – Sure Klean® Weather Seal SL100 Water Repellent, Stand Off® SLX100 Water & Oil Repellent and Sure Klean® Weather Seal Blok-Guard® & Graffiti Control II were evaluated for their ability to provide water repellency to the submitted samples.

**Products Evaluated****New Construction Cleaning Products Evaluated**

<b>Sample</b>	<b>Product</b>	<b>Dilution</b>
All Submitted Cast Stone Wall Caps	Sure Klean® Burnished Custom Masonry Cleaner	(1:2), (1:3)

**Protective Water Repellent Products Evaluated**

<b>Sample</b>	<b>Product</b>	<b>Dilution</b>
All Submitted Cast Stone Wall Caps	Stand Off® SLX100 Water & Oil Repellent	Concentrate
	Sure Klean® Weather Seal SL100 Water Repellent	Concentrate
	Sure Klean® Weather Seal Blok-Guard® Graffiti Control II	Concentrate

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

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## **New Construction Cleaning**

These cleaning trials were conducted to determine the optimal cleaning/cure time combination to most efficiently remove Type S mortar from the submitted samples while leaving the external surface looking most like the uncleaned cast stone wall cap during new construction operations.

Type S cementitious mortar was prepared in compliance with the manufacturer's instructions, applied to the cast stone wall cap and allowed to cure. Mortar removal was accomplished using chemical assistance and a high-pressure water rinse with pressure rinsing equipment. The removal of Type S cementitious mortar was visually evaluated after 3, 7 and 14 days of curing.

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## **Description of Products Evaluated – New Construction Cleaning**

**Sure Klean® Burnished Custom Masonry Cleaner** – Removes common construction and atmospheric staining from custom masonry and other architectural concrete surfaces. This general-purpose, non-etching, acidic cleaner removes rust, mud, oil, atmospheric dirt, mortar smears and other stains without altering the surface texture. Burnished Custom Masonry Cleaner adds depth to colors and brightens white matrices and exposed aggregate.

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## **Test Method – New Construction Cleaning**

Chemical cleaners were evaluated using the following procedure:

1. Pre-wet the surface with water.
2. Apply at the appropriate dilutions.
3. Allow appropriate dwell time, as specified.  
     Sure Klean® Burnished Custom Masonry Cleaner..... 3-5 minutes
4. Reapply the product and moderately agitate with a brush.
5. Pressure rinse thoroughly.\*
6. Compare the uncleaned body surfaces to the cleaned surfaces for the best match.

**\*Pressure Rinsing Equipment** – Masonry washing equipment generating approximately 700-800 psi with a water flow rate of 8 gallons per minute delivered through a 45 degree fan spray tip was used for rinsing.

**Test Results – New Construction Cleaning****Cleaning Effectiveness (% Type S Mortar Removal)**

<b>“Shell” Cast Stone Wall Cap</b>				
<b>Product</b>	<b>Dilution</b>	<b>3 day</b>	<b>7 day</b>	<b>14 day</b>
Sure Klean® Burnished Custom Masonry Cleaner	1:2	100%	100%	100%
Sure Klean® Burnished Custom Masonry Cleaner	1:3	100%	100%	100%
<b>“Auburn” Cast Stone Wall Cap</b>				
<b>Product</b>	<b>Dilution</b>	<b>3 day</b>	<b>7 day</b>	<b>14 day</b>
Sure Klean® Burnished Custom Masonry Cleaner	1:2	100%	100%	100%
Sure Klean® Burnished Custom Masonry Cleaner	1:3	100%	100%	100%
<b>“Summit” Cast Stone Wall Cap</b>				
<b>Product</b>	<b>Dilution</b>	<b>3 day</b>	<b>7 day</b>	<b>14 day</b>
Sure Klean® Burnished Custom Masonry Cleaner	1:2	100%	100%	100%
Sure Klean® Burnished Custom Masonry Cleaner	1:3	100%	100%	100%
<b>“Normandy” Cast Stone Wall Cap</b>				
<b>Product</b>	<b>Dilution</b>	<b>3 day</b>	<b>7 day</b>	<b>14 day</b>
Sure Klean® Burnished Custom Masonry Cleaner	1:2	100%	100%	100%
Sure Klean® Burnished Custom Masonry Cleaner	1:3	100%	100%	100%

**Test Results – Color Uniformity**

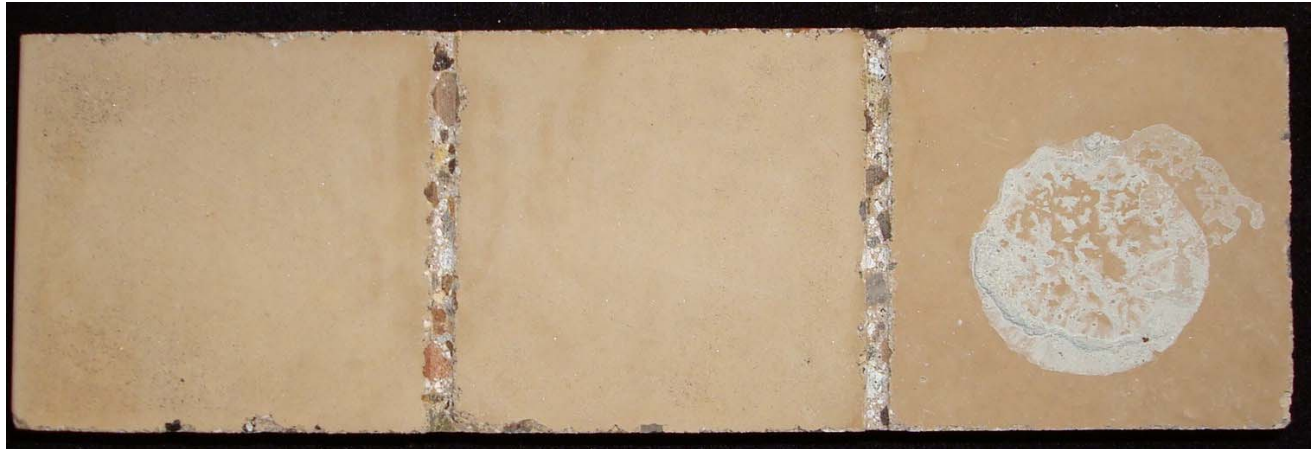
<b>Substrate:</b> Cast Stone Wall Cap		<b>Pigment Color:</b> “Shell”		
Product	Dilution	Aggregate Exposure	Surface Pigment Alteration/Removal	
Sure Klean® Burnished Custom Masonry Cleaner	1:2	2	1	
Sure Klean® Burnished Custom Masonry Cleaner	1:3	3	2	
<b>Substrate:</b> Cast Stone Wall Cap		<b>Pigment Color:</b> “Auburn”		
Product	Dilution	Aggregate Exposure	Surface Pigment Alteration/Removal	
Sure Klean® Burnished Custom Masonry Cleaner	1:2	2	1	
Sure Klean® Burnished Custom Masonry Cleaner	1:3	3	2	
<b>Substrate:</b> Cast Stone Wall Cap		<b>Pigment Color:</b> “Summit”		
Product	Dilution	Aggregate Exposure	Surface Pigment Alteration/Removal	
Sure Klean® Burnished Custom Masonry Cleaner	1:2	2	1	
Sure Klean® Burnished Custom Masonry Cleaner	1:3	3	2	
<b>Substrate:</b> Cast Stone Wall Cap		<b>Pigment Color:</b> “Normandy”		
Product	Dilution	Aggregate Exposure	Surface Pigment Alteration/Removal	
Sure Klean® Burnished Custom Masonry Cleaner	1:2	2	1	
Sure Klean® Burnished Custom Masonry Cleaner	1:3	3	2	

Scale used for reporting results of both categories:

- |   |  |
|---|--|
| 0 – <b>Worst</b> match to uncleaned surface | 3 – <b>Good</b> match to uncleaned surface |
| 1 – <b>Poor</b> match to uncleaned surface  | 4 – <b>Best</b> match to uncleaned surface |
| 2 – <b>Fair</b> match to uncleaned surface  |  |

**Photographs – New Construction Cleaning**

**“Auburn” Cast Stone Wall Caps; 3 Day Cleaning**



**Sure Klean® Burnished Custom  
Masonry Cleaner (1:2)**

**Sure Klean® Burnished Custom  
Masonry Cleaner (1:3)**

**Untreated Control**

**“Auburn” Cast Stone Wall Caps; 7 Day Cleaning**



**Sure Klean® Burnished Custom  
Masonry Cleaner (1:2)**

**Sure Klean® Burnished Custom  
Masonry Cleaner (1:3)**

**Untreated Control**



**Photographs – New Construction Cleaning**

**“Auburn” Cast Stone Wall Caps; 14 Day Cleaning**



**Sure Klean® Burnished Custom  
Masonry Cleaner (1:2)**

**Sure Klean® Burnished Custom  
Masonry Cleaner (1:3)**

**Untreated Control**

**Photographs – Color Uniformity**

**“Auburn” Cast Stone Wall Caps**



**Sure Klean® Burnished Custom  
Masonry Cleaner (1:2)**

**Sure Klean® Burnished Custom  
Masonry Cleaner (1:3)**

**Untreated Control**

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**Conclusions – New Construction Cleaning**

Based on the test results, all of the PROSOCO, Inc. products tested performed well in removing excess Type S mortar from the submitted samples even after allowing the mortar to remain on the surface of the samples for 14 days.

Use higher concentrations and surface agitation to maximize aggregate exposure. Use low concentration and surface agitation to minimize aggregate exposure.

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**Recommendations – New Construction Cleaning**

Recommendations for cleaning for the cast stone wall caps submitted by Select Cast Series, American Canyon, CA are provided in the chart below. Recommendation is based on the optimum dilution for complete removal of mortar while providing the best match for color uniformity when compared to the uncleaned cast stone wall cap.

<b>Sample</b>	<b>New Construction Cleaning (Type S mortar, 14 day cleaning)</b>
All Submitted Cast Stone Wall Cap	Sure Klean® Burnished Custom Masonry Cleaner (1:3)

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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## **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
- 

### **Description of Products Evaluated – Protective Water Repellents**

**Stand Off<sup>®</sup> SLX100 Water & Oil Repellent** – Combines water and oil repellency on most substrates to prevent staining by waterborne and oily substances. This modified “neat” silane system offers invisible protection and low volatility. The small molecular structure of SLX100 allows for maximum penetration at coverage rates higher than that of conventional silanes. Depth of penetration is controlled by the application rate (loading rate). This makes SLX100 ideal for protecting granite and other dense, color-sensitive surfaces.

**Sure Klean<sup>®</sup> Weather Seal SL100 Water Repellent** – A modified, “neat” silane system that offers invisible protection and low volatility and complies with all known regulations limiting the Volatile Organic Compound (VOC) content of architectural coatings and sealers. SL100 protects horizontal and vertical concrete and masonry surfaces against water and waterborne contaminants. The small molecular structure of SL100 ensures maximum penetration and colorless protection of dense, color-sensitive surfaces. Ideal for GFRC, integrally colored pre-cast concrete and many types of natural stone.

**Sure Klean<sup>®</sup> Weather Seal Blok-Guard<sup>®</sup> & Graffiti Control II** – A clear-drying, water-based silicone emulsion for weatherproofing concrete block and other porous masonry materials. Blok-Guard<sup>®</sup> & Graffiti Control II also protects masonry surfaces from graffiti attacks without altering the natural appearance. Blok-Guard<sup>®</sup> & Graffiti Control II protects exterior walls exposed to normal weathering. Graffiti removal from treated surfaces is fast and easy using Defacer Eraser<sup>®</sup> Graffiti Wipe. Blok-Guard<sup>®</sup> & Graffiti Control II is easy to apply with low-pressure spray, brush or roller.

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### **Sample Preparation – Protective Water Repellents**

The submitted cast stone wall caps were scored and allowed to dry for 24 hours prior to treatment. All treatments were applied by brush in accordance with the current PROSOCO, Inc. Product Data Sheet application instructions. The treatments were allowed to cure for at least 72 hours prior to testing.

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**Test Methods – Protective Water Repellents****Water Absorption Tube Test: Horizontal RILEM II.4, 5.0 milliliters, 20 minutes**

The water absorption tube test simulating wind driven and wind blown rain conditions was performed. Tests were run with vertical 5.0-milliliter head pressures. Filled to 5.0 milliliters, a water absorption tube produces a 103 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 5.0 mL of water or more, then:

A rating of **AA** *Above Average* water repellent performance would be reported for treatments which result in a loss of no more than:

$$5.0 \text{ mL} \times 20\% = \mathbf{1.0 \text{ mL}}$$

A rating of **A** *Average* water repellent performance would be reported for treatments which result in a loss of no more than:

$$5.0 \text{ mL} \times 50\% = \mathbf{2.5 \text{ mL}}$$

A rating of **BA** *Below Average* water repellent performance would be reported for treatments which result in a loss of more than:

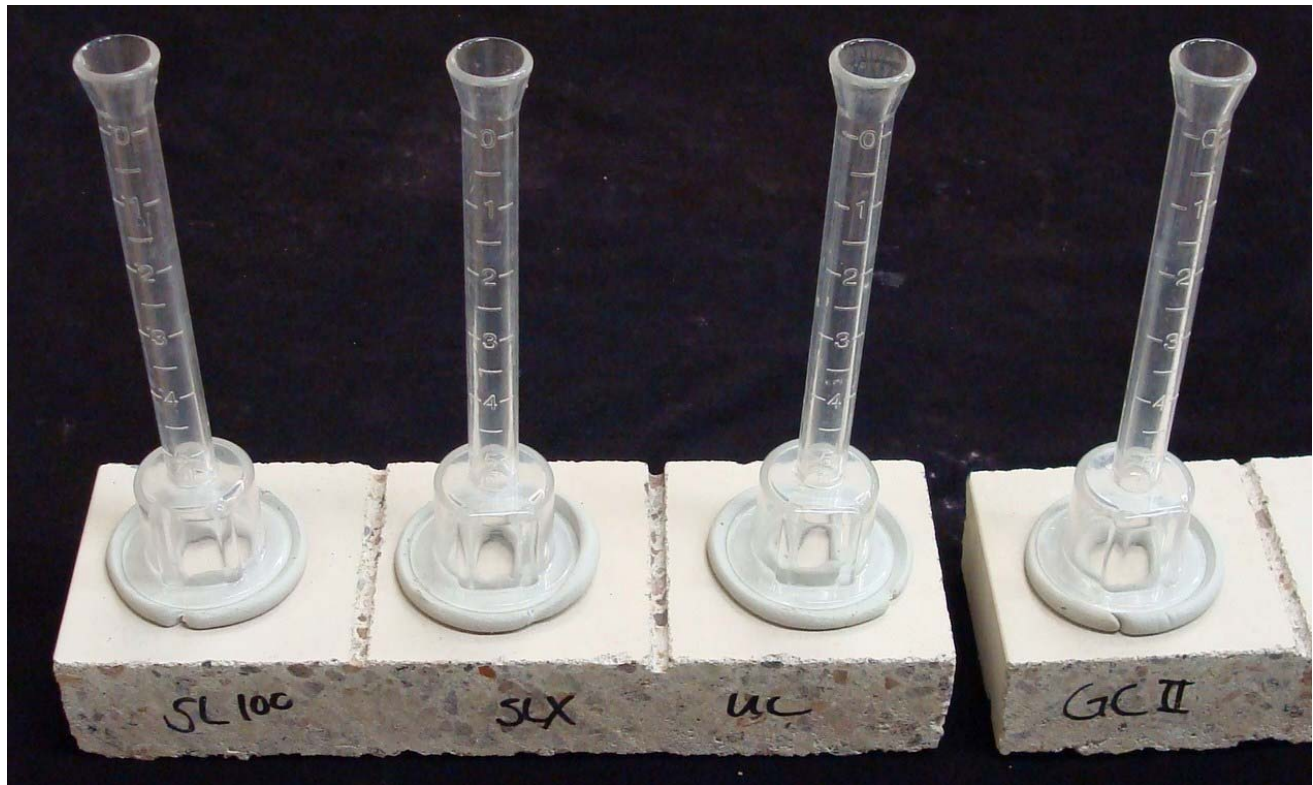
$$5.0 \text{ mL} \times 50\% = \mathbf{2.5 \text{ mL}}$$

**Test Results – Protective Water Repellents****Water Absorption Tube Test: Horizontal RILEM II.4, 5.0 milliliters, 20 minutes****AA = Above Average****A = Average****BA = Below Average**

<b>“Shell”</b>	<b><u>Results in mL loss</u></b>	<b><u>Ranking</u></b>
Untreated Control	0.4	--
Stand Off <sup>®</sup> SLX100 Water & Oil Repellent	0.0	<b><u>AA</u></b>
Sure Klean <sup>®</sup> Weather Seal SL100 Water Repellent	0.0	<b><u>AA</u></b>
Sure Klean <sup>®</sup> Weather Seal Blok-Guard <sup>®</sup> & Graffiti Control II	0.0	<b><u>AA</u></b>
<b>“Auburn”</b>	<b><u>Results in mL loss</u></b>	<b><u>Ranking</u></b>
Untreated Control	0.3	--
Stand Off <sup>®</sup> SLX100 Water & Oil Repellent	0.0	<b><u>AA</u></b>
Sure Klean <sup>®</sup> Weather Seal SL100 Water Repellent	0.0	<b><u>AA</u></b>
Sure Klean <sup>®</sup> Weather Seal Blok-Guard <sup>®</sup> & Graffiti Control II	0.0	<b><u>AA</u></b>
<b>“Summit”</b>	<b><u>Results in mL loss</u></b>	<b><u>Ranking</u></b>
Untreated Control	0.3	--
Stand Off <sup>®</sup> SLX100 Water & Oil Repellent	0.0	<b><u>AA</u></b>
Sure Klean <sup>®</sup> Weather Seal SL100 Water Repellent	0.0	<b><u>AA</u></b>
Sure Klean <sup>®</sup> Weather Seal Blok-Guard <sup>®</sup> & Graffiti Control II	0.0	<b><u>AA</u></b>
<b>“Normandy”</b>	<b><u>Results in mL loss</u></b>	<b><u>Ranking</u></b>
Untreated Control	0.8	--
Stand Off <sup>®</sup> SLX100 Water & Oil Repellent	0.0	<b><u>AA</u></b>
Sure Klean <sup>®</sup> Weather Seal SL100 Water Repellent	0.0	<b><u>AA</u></b>
Sure Klean <sup>®</sup> Weather Seal Blok-Guard <sup>®</sup> & Graffiti Control II	0.0	<b><u>AA</u></b>

**Photographs – Protective Water Repellents**

**“Shell” Cast Stone Wall Cap; Horizontal RILEM II.4, 5.0 milliliters, 20 minutes**



**Sure Klean® Weather Seal SL100 Water Repellent**

**Stand Off® SLX100 Water & Oil Repellent**

**Untreated Control**

**Sure Klean® Weather Seal Blok-Guard® Graffiti Control II**

**Conclusions – Protective Water Repellents**

Based upon laboratory evaluations, Stand Off® SLX100 Water & Oil Repellent, Sure Klean® Weather Seal SL100 Water Repellent and Sure Klean® Weather Blok-Guard® & Graffiti Control II exhibited excellent water repellency on the submitted samples.

**Recommendations – Protective Water Repellents**

Recommendations for water repellency treatments for the cast stone wall caps submitted by Select Cast Series, American Canyon, CA are provided in the chart below. Recommendations are based on the treatment that proved most effective at providing water repellency on all types submitted.

Sample	Protective Water Repellents
All Submitted Cast Stone	Stand Off® SLX100 Water & Oil Repellent OR Sure Klean® Weather Seal SL100 Water Repellent OR Sure Klean® Weather Seal Blok-Guard® & Graffiti Control II

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.

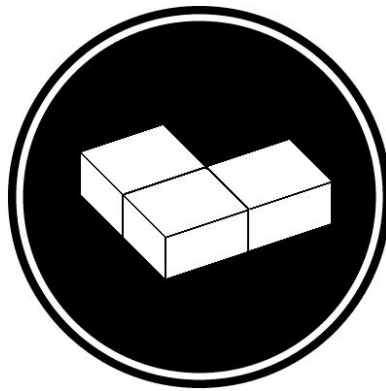


John Lancaster  
Project Testing Laboratory Technician



***PALLET TAG PROGRAM***  
*Laboratory Report*

Select Cast Series  
1111 Green Island Road  
American Canyon, CA 94503  
Cast Stone Wall Cap



*Project No. 0705-10 PTP*

*Prepared For:*  
**PROSOCO**  
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AMT Laboratories  
July 2007