



Technology and Innovation Deployment Program STIC Incentive Application Form

Proposal Name: BRIDGE DECK CURE AND SEAL

STIC/State Name: OKLAHOMA

FY: 2019

Innovation: Combing an ASTM C309 membrane Curing Compound with a Silane Sealer in one Application during the "Green Concrete" Stage. While in the " Green " state, applied with the curing compound in the mix the concrete is receptive to Silane. The Acrylic cure membrane evaporation and allows the silane to fill the Capillary pores that Will significantly reduces shrinkage cracking and premature hydration during the curing process of freshly poured bridge decks .Reduce Permability and give a stronger surface

- ODOT and FHWA want a better curing method
- All the Prime Bridge Contractors want a better cure method of application and end product because they ultimatey are accountable for the outcome of that bridge deck pour
- DOT's currently using are Kentucky, West Virginia, South Carolina and Tennessee

Description of the Proposed Work: Cure and Seal two new bridge decks in ODOT Div #8 With " SILENCUREDOT" product instead of Wet Cure method currently specified in "ODOT 504". Wait for 28 day Cure and do core samples so we can test for:

- Salt Ponding (Chloride infiltration)
- Test for the depth of penetration of the Silane that was added in the cure
- Detailed overall aesthetics of the bridge deck in reference to hydration cracking
- Write a detailed evaluation after that 28 day cure
- Come back in 6 months and do the same detailed reporting to see if there was any change

See exhibit #1 for smaple testing ***** on last page of application

End Product: Better finished bridge deck by sealing the Capillary Pores and allowing moisture to be contained in the deck slab. Convential Wet curing has shown that in a perfect world fresh concrete under 24/7 water is the ideal cure but in reality in the field there is a large margin of error be it with the Contractor or application specific. If the bridge is on a skew or slope the water rolls right off the deck and will not get wet cured at all.

Proposal Schedule: Start Immediately when the two ODOT Div #8 bridge decks when they are ready to pour. There will be field apolication assistance provided at no charge to the Prime contractor .ODOT to commission the Core testing and reporting.

Champion(s): ODOT Div# 8 / Bruce Arnold , ODOT / Matt Romero , ODOT / Walt Peters , Waseem Fazal / FHWA

Estimated Total Cost: 40,000.00

**Amount of STIC
Funds Requested:**

32,000.00

Estimated Total Cost/Budget Breakdown:

Total estimate will cost 40,000.00 includes :

- ODOT core Testing
- Commission ODOT approved testing firm for reporting at 28 day cure and for 180 day cure

Suppliers of Technology will provide the material and the field support for application at time of the deck pours

Source of Other Funds or Sponsors: not applicable on this STIC proposal

EXHIBIT # 1

Test Data

Product Overview

Submittal Year: 2018
 NTPEP Number: CCC-2018-02-006
 Manufacturer Name: chemmasters
 Product Name: Silencure DOT

Test Data Summary

Release Status: Restricted

Additional Documentation

Report Title	Document
Currently no reports are available.	

AASHTO M 148 - Visual Inspection	Unit	Result
Color		White
Consistency (Acceptable/Unacceptable)		OK
Condition of film at 7 days (Acceptable/Unacceptable)		OK
Deleterious Reaction with Concrete (Yes/No)		None
Drying Time Test	Hrs:Mins	0:30

AASHTO T 155 - Testing Parameters	Unit	Testing Parameters
Method of application		Spray
Rate of application	l/m ²	0.2

AASHTO T 155 - Physical Testing	Unit	Rep1	Rep2	Rep3	Average
Density	kg/m ³				1007
Moisture Loss @ 24 Hours	kg/m ²	0.08	0.09	0.07	0.08
Moisture Loss @ 72 Hours	kg/m ²	0.2	0.22	0.19	0.2
Reflectance Test (ASTM E 1347) [using CIE D65/2°]		62.58	60.3	62.58	61.8
Long-Term Settling Test (MNDOT Test Procedure (72 hrs))	ml				0
Nonvolatile Content Test (ASTM D 1644)	%	30.82	30.8	30.72	30.78
Flash Point Test (ASTM D 93)	F				>212

FTIR Spectrum	Document
	NTPEP CCC-2018-02-006.pdf

Attached Documents	Documents
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Construction Technology Laboratories, Inc.

5400 Old Orchard Road
Skokie, Illinois 60077
847.965.7500
Fax 847.965.6541
www.CTLGroup.com

March 4, 2004

Mr. Paul Smith
ChemMasters
300 Edwards Street
Madison, OH 44057-3112
E-mail: alchemist_ps@hotmail.com

Via E-mail

Phone: (440) 428-2105
Fax: (440) 428-7091

**NCHRP Report 244-Series II Test Results for
One Product Identified as "Silencure"
CTL Project No.: 380078**

Dear Mr. Smith:

Attached are the test results for the referenced product. You submitted and identified the product that arrived at CTL in late October 2003.

Testing of the product was performed in accordance with NCHRP Report 244-Series II. The product was applied by brush at the specified application rate of 150 ft²/gallon.

Test results indicate specimens treated with "Silencure" reduced chloride ion penetration by 83% for samples coated at 1 day, by 87% for samples coated at 5 days and by 84% for samples coated at 21 days as compared to untreated control specimens.

We will retain the remainder of the product until July 2004, at which time it will be discarded, unless we hear otherwise from you.

Should you have any questions, please contact me. Thank you for choosing CTL for your testing needs.

Sincerely,
CONSTRUCTION TECHNOLOGY LABORATORIES, INC.
An AASHTO Accredited Laboratory - Aggregate, Cement and Concrete

Katie Amelio
Katie Amelio
Project Assistant, Supervisor
Materials Testing & Analysis
kamelio@CTLgroup.com
847-972-3168

Ohio Department of Transportation District 02	
ACCEPTED	
ACCEPTED AS NOTED	
ACCEPTED AS NOTED & RESUBMIT	
NOT ACCEPTED	
for general conformance with design and specifications only. Does not relieve contractor from responsibility for errors or omissions.	
<i>[Signature]</i>	07/14/04
SIGNATURE	DATE

The following additional information is requested from FCC prior to further product review.

ASTM C309 test results. This is the specification for curing compound which ChemMasters should be able to provide.

Application rates:

What was the application rate on the silencure cured portion of the test wall? [S sq ft per gal.]

Structural/Architectural Engineering, Testing and Materials Technology

NCHRP 244 test data from the Chemmaster's CTL report indicates an application rate of 150 sq ft. per gal. The application rate used in the field should be the same as the NCHRP 244.

Request ChemMasters to address the possibility of any need to adjust the application rate to take into account the surface finish differences between the NCHRP 244 test data samples and the actual finish provided by slipforming.



Construction Technology Laboratories, Inc.

5400 Old Orchard Road
Skokie, Illinois 60077
847.965.7500
Fax 847.965.6541
www.CTLGroup.com

Client: ChemMasters
Project: NCHRP Series II Testing of "Silencure"
Contact: Mr. Paul Smith
Submitter: Mr. Paul Smith

CTL Proj. No.: 380078
CTL Proj. Mgr.: K. Amelio
Technician: Concrete Lab
Approved: M. Morrison
Date: November 18, 2003

**Mix Design and Fresh Concrete Properties of Concrete Used to
Fabricate Specimens for NCHRP Series II Testing**

<u>Material</u>	<u>Quantity</u>
Type I Portland Cement, CTL Lot No. 18L0040, pcy	439
Eau Claire Sand, pcy	1475
Eau Claire Coarse Aggregate, pcy	1774
Water, pcy	225

<u>Properties</u>	<u>Parameters</u>
Slump, in.	2.25
Air Content, %	7.5
Unit Weight, pcf	143.1

Client: ChemiMasters

Proj.: NCHRP 244 - Series II Testing of One Sealer Identified as "Silencure" at Application Rate of 150 ft²/gal

Submitter: Mr. Paul Smith

Contact: Mr. Paul Smith

CTL Proj. No.: 380078

CTL Proj. Mgr.: K. Amelio

Technician: Mortar Lab

Approved: Mike Morrison

Date: March 4, 2004

AVERAGE WEIGHT CHANGE DURING SOAKING AND DRYING PERIODS (1)

Sealer Identification	Days of Drying Before Coating	% Absorption During Immersion in 15% NaCl Solution at Days Indicated									% Weight Loss During Days of Drying After 21 Days of Immersion in 15% NaCl Solution												
		3			6			9			12			15			18			21			
<i>Silencure</i>	1 day	0.10	0.18	0.23	0.25	0.29	0.33	0.35	0.22	0.35	0.45	0.50	0.57	0.61	0.62								
	5 days	0.13	0.20	0.26	0.27	0.33	0.36	0.38	0.25	0.36	0.45	0.50	0.57	0.61	0.62								
	21 days	0.17	0.25	0.31	0.35	0.41	0.43	0.45	0.26	0.38	0.47	0.52	0.57	0.61	0.62								
<i>Control</i>	(2)	2.02	2.11	2.15	2.17	2.20	2.20	2.20	0.62	0.97	1.22	1.32	1.45	1.52	1.54								
<i>Air Dry</i>	(3)	-0.02	-0.04	-0.05	-0.05	-0.08	-0.09	-0.15	-0.15	-0.23	-0.29	-0.34	-0.39	-0.42	-0.39								

Notes:

1. Data represents average of two specimens.
2. Uncoated specimens subjected to 21 days in 15% NaCl, then 21 days air drying.
3. Uncoated specimens in continuous air dry.

Client: ChemMasters

Proj.: NCHRP 244 - Series II Testing of One Sealer Identified as
"Silencure" at Application Rate of 150 ft²/gal

Submitter: Mr. Paul Smith

Contact: Mr. Paul Smith

CTL Proj. No.: 380078

CTL Proj. Mgr.: K. Amelio

Technician: Mortar Lab

Approved: Mike Morrison

Date: March 4, 2004

SUMMARY OF FINAL WEIGHT GAIN AND TOTAL CHLORIDE CONTENT(I)

Sealer Identification	Days of Drying Before Coating	Final Weight Gain		Total Chloride Ion Content % by Weight of Concrete(2)	Reduction in Chloride Ion Content, %
		% by Weight	% of Control		
Silencure	1 day	0.35	16	0.036	83
	5 days	0.38	17	0.029	87
	21 days	0.45	20	0.035	84
Control	(3)	2.20	100	0.217	--
Air Dry	(4)	-0.15	--	0.005	--

Notes:

1. Data represents average of two specimens.
2. Corrected for baseline chloride content of 0.005.
3. Uncoated specimens subjected to 21 days in 15% NaCl, then 21 days air drying.
4. Uncoated samples in continuous air dry.

Testing of "Silencure" at Application Rates of 150 ft²/gal - in Accordance with NCHRP Report 244 -Series II, % Absorption During Immersion in 15% NaCL Solution

