



Non-Conformance Report Rev. 3

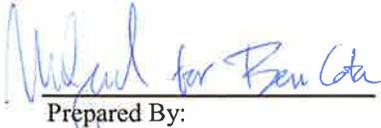
Date Submitted: Monday, July 20, 2015
 Job Name/No.: Castleton / #23456
 Piece Mark #'s: CT-NB2 (1)
 Production Date: 6/15/2015
 QA Inspector, Co.: R. Hamilton, KTA & B Girouard, HRV

- ➔ In response to VTAOT email of 7/7/15 rejecting our non-conformance report submitted 7/2/15 we herein offer the following additional comments to address the concerns outlined in the email. Comments are offered in **green font and underlined**. In response to VTAOT email on 7/13/15, we offer the following additional comments identified by **blue font and underlined**. In response to our jobsite meeting with VTAOT on 7/20/15, we offer the following additional comments identified by **red font and underlined**.
- ➔ After placement of the final load of concrete in unit NB2 foaming was observed at the top of the finished surface. Most of the foam was floated off of the unit during the finishing of the surface. The portion of the surface that received a rake finish has small (1/16th - 1/8th inch diameter) hemispherical indentations where the foaming occurred - see attached photo.

- ▶ The dosage of HRWR (identified as "6100" on the batch ticket) was inadvertently increased on the final load that exhibited the surface foaming - see attached tickets. The increase in water-reducer dosage reduced the viscosity of the cement paste causing a corresponding decrease in the static stability of the coarse aggregate in the concrete. As the larger coarse aggregate sinks within the depth of the placement an air pocket is created in the location that the aggregate originally was and the air pocket floats up to the surface. This is observed as foaming when a high volume of the air pockets reach the surface in a short period of time.
- ▶ The batch of concrete was checked visually before placement **by QC personnel** but was not sampled because the previous load had been tested and test cylinders for that load were made. Static stability can be difficult to interpret as concrete is flowing up through the fins of the mixer and the change in dosage of the HRWR on the batch ticket was not identified by QC or QA prior to placement. JPC QC shall verify the correct dosage rates of all loads prior to placement and changes to any admixture dosage shall be verified by sampling & testing. **Further, there shall be adequate QC personnel present at future pours to ensure that the sampling, testing, and all other qc procedures can be accomplished as required.**
- ▶ Cores from the surface of the unit were taken and evaluated for hardened air content at two locations where the subject load of concrete was placed and a third location outside of the placement of that load for comparison. **Any damage to the epoxy coating on the rebar as a result of the coring shall be touched up with two-part epoxy as provided by the rebar supplier.** Hardened air content (ASTM 457) and petrographic analysis will be performed on the cores to verify acceptability of the water-cement ratio and durability properties of the placed concrete.
- ▶ All laitance and loose material shall be removed prior to placement of the secondary poured curb. **To**

accomplish this action JPC proposes to abrasive blast the entire top surface of the NEXT beam with two passes of coarse grit sand at maximum pressure to remove all unsound material. Curb reinforcement shall be shielded from the sand during blasting and any damage to the epoxy coating shall be touched up prior to placement of the curb. Further, underneath the curb areas where the surface grooves will have been blasted smoother we will apply Sikadur 32 Hi Mod epoxy bonding agent prior to pouring the curb. Bonding agent shall be mixed and applied per the manufacturers' instructions - see attached data sheet. Following sandblasting of the top surface of the beam, there are additional hairline shrinkage cracks observed which JPC proposes to seal with Protectosil Degadeck CSS low viscosity reactive methylmethacrylate. John LaRosa with NICOM Coatings confirmed that there are no compatibility issues with the waterproofing membrane system used on the project. The presence of less aggregate and more cementitious material in the top of the beam can result in the observance of more shrinkage cracks. JPC QC shall verify and correct dosage rates of all loads prior to placement and changes to any admixture dosage shall be verified by sampling and testing.

- ▶ To address VTAOT's concerns relative to the unknown compressive strength of the concrete in the subject flange, JPC has evaluated the beam based on a concrete strength of 7,000 psi, less than the design strength of 10,000 psi. JPC finds that the top tension in the beam at release of 477 psi is less than the limit of 627 psi, and the longitudinal reinforcement in the top mat of steel in the flange is sufficient. In service the top flange is in compression and the stress is less than the limit. The evaluation of the beam in service is conservative as the effect of integral abutments is neglected. Please see attached beam stress analysis calculations dated 7/20/15. Based on test cylinders, the concrete strength of concrete placed in the stems of the subject beam is 10,776 psi. JPC believes that the actual concrete strength of the flange is 10,000 psi, as the camber of the subject beam matches the camber of the other fascia beam with known compressive strength, indicating uniform performance between the two beams.
- ▶ Surface treatments shall be performed at the precast plant prior to placement of the curb and delivery of the unit. They shall be supervised by JPC QC and witnessed by the QA Inspector.

 Prepared By:

Benjamin L. Cota, Production Engineer
Michael Weigand, P.E.

Date:

7/20/15

Enclosures: Concrete Batch Tickets

Photo of raked concrete surface at curb

Sikadur 31 data sheet

Protectosil Degadeck CSS

JPC Beam Stress Analysis

JP CARRARA & SONS, INC.

124420

2464 Case Street ♦ Middlebury, VT 05753
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 www.jp carrara.com

PRECAST CONCRETE ♦ READY-MIX CONCRETE ♦ CONCRETE PUMPING ♦ SAND, STONE & GRAVEL

PLANT 02	TIME 10:45 AM	DATE 6/15/15	ACCOUNT 11247	JOB NUMBER 000144	TRUCK M42	DRIVER LAPELL, ROY
CUSTOMER 11247 MIDDLEBURY PRECAST-NEED JOB #				DELIVERY ADDRESS / DIRECTIONS 23456-015		
PURCHASE ORDER		DELIVERY LOCATION		DELIVERY LOCATION CODE 02	TAX 01	SLUMP 5.00 in
LOAD QTY 8.05 yd	PRODUCT 430M	DESCRIPTION 20% NO FLYASH 10000PSI N	AMT ORDERED 48.30	AMT DELIVERED 48.30	UNIT PRICE	AMOUNT
<p style="font-size: 2em; color: blue; text-align: center;">5TH LOAD PLACED</p>			<p style="font-size: 1.5em; color: blue; text-align: center;">5.7% AIR MADE TEST CYLINDERS.</p>			
NOTES / CONCRETE USE: <UNKNOWN> WATER ADDED AT CUSTOMER REQUEST (GALLONS):						

LEAVE PLANT	ARRIVE JOB SITE	LEAVE JOB SITE	RETURN PLANT
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Time allowed for unloading is five minutes per yard or thirty minutes, whichever is longer. Additional time for unloading is subject to a Demurrage charge.

CAUTION: Freshly mixed concrete may cause skin irritation or chemical burns. Avoid direct contact where possible and wash exposed skin areas promptly with water.

When delivery is made inside the curb line, Customer agrees to accept full responsibility and assumes all risk for any and all damage caused to driveways, sidewalks, buildings, vehicles, lawns, trees, shrubs, utility wires, or any other items or property, real or personal located at the delivery site. Customer agrees to indemnify, defend and hold JP Carrara & Sons, Inc. harmless from and against any and all damage, loss, cost or expense relating to or arising from all such deliveries.

Additional water added to this concrete will reduce its strength. Any water added at the request of customer is done so at customer's own risk.

JP Carrara & Sons, Inc., having no control over the use of materials sold, shall not be held responsible for the quality of any finished products, unless otherwise contracted in writing.

All amounts due on account are payable net 30 days from the date of invoice. Interest in the amount of 1½% per month (18% per annum) shall be applied to any amounts unpaid within this period.

SUBTOTAL

DISCOUNT

TAX

TOTAL

Please SIGN HERE acknowledging receipt of materials and acceptance of the terms and conditions contained herein.

Truck M42	Driver 1014	User user	Disp Ticket Num 12020	Ticket ID 124420	Time 10:45	Date 6/15
Load Size 8.05 CY	Mix Code 430M	Returned	Qty	Mix Age	Seq W1	Load ID 30944

Material	Design Qty	Required	Batched	% Var	% Moisture	Actual	Wat
3/4 STONE	1440 lb	11636 lb	11540 lb	-0.83%	0.38% M		5 gl
SAND	1220 lb	21724 lb	21660 lb	-0.30%	3.70% M		43 gl
TYPE III	720.0 lb	5786.0 lb	5795.0 lb	0.16%			
FLYASH	180.0 lb	7244.0 lb	7230.0 lb	-0.19%			
AEA	9.00 oz	72.45 oz	73.00 oz	0.76%			
PLAST	3.00 /C	217.35 oz	217.00 oz	-0.16%			
6100	9.00 /C	652.05 oz	651.00 oz	-0.16%			
DCI	5.0 gl	40.3 gl	40.4 gl	0.31%			
WATER	28.00 gl	176.58 gl	176.00 gl	-0.33%		176.00 gl	

Actual Load 30764 lb Slump: 5.00 in
 Num Batches: 2
 Design 0.260 Water/Cemen 0.260 T
 Water in 0.0 gl Adjust Water: 0.0 gl /
 Design 225.4 gl Actual 224.5 gl To Add:
 Trim Water: 0.0 gl / CY

Load Completed Load Time: 6 : 55 ---Tares-----

JP CARRARA & SONS, INC.

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PRECAST CONCRETE ♦ READY-MIX CONCRETE ♦ CONCRETE PUMPING ♦ SAND, STONE & GRAVEL

PLANT 02	TIME 11:20 AM	DATE 6/15/15	ACCOUNT 11247	JOB NUMBER 000144	TRUCK M60	DRIVER MARTELL, JAMES
CUSTOMER 11247 MIDDLEBURY PRECAST-NEED JOB #				DELIVERY ADDRESS / DIRECTIONS 23456-015		
PURCHASE ORDER		DELIVERY LOCATION		DELIVERY LOCATION CODE 02	TAX 01	SLUMP 5.00 in
LOAD QTY 8.05 yd	PRODUCT 430M	DESCRIPTION 20% FLYASH 10000PSI N	AMT ORDERED 56.35	AMT DELIVERED 56.35	UNIT PRICE	AMOUNT

6TH LOAD PLACED.

NOTES / CONCRETE USE: <UNKNOWN>
 WATER ADDED AT CUSTOMER REQUEST (GALLONS):

LEAVE PLANT	ARRIVE JOB SITE	LEAVE JOB SITE	RETURN PLANT
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Time allowed for unloading is five minutes per yard or thirty minutes, whichever is longer. Additional time for unloading is subject to a Demurrage charge.

CAUTION: Freshly mixed concrete may cause skin irritation or chemical burns. Avoid direct contact where possible and wash exposed skin areas promptly with water.

When delivery is made inside the curb line, Customer agrees to accept full responsibility and assumes all risk for any and all damage caused to driveways, sidewalks, buildings, vehicles, lawns, trees, shrubs, utility wires, or any other items or property, real or personal located at the delivery site. Customer agrees to indemnify, defend and hold JP Carrara & Sons, Inc. harmless from and against any and all damage, loss, cost or expense relating to or arising from all such deliveries.

Additional water added to this concrete will reduce its strength. Any water added at the request of customer is done so at customer's own risk.

JP Carrara & Sons, Inc., having no control over the use of materials sold, shall not be held responsible for the quality of any finished products, unless otherwise contracted in writing.

All amounts due on account are payable net 30 days from the date of invoice. Interest in the amount of 1½% per month (18% per annum) shall be applied to any amounts unpaid within this period.

SUBTOTAL

DISCOUNT

TAX

TOTAL

Please SIGN HERE acknowledging receipt of materials and acceptance of the terms and conditions contained herein.

Truck M60	Driver 1013	User user	Disp Ticket Num 12022	Ticket ID 124422	Time 11:20	Date 6/15
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Load Size 8.05 CY	Mix Code 430M	Returned	Qty	Mix Age	Seq W1	Load ID 30946
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Material	Design Qty	Required	Batched	% Var	% Moisture	Actual	Wat
3/4 STONE	1440 lb	11636 lb	11600 lb	-0.31%	0.38% M		5 gl
SAND	1220 lb	21784 lb	21740 lb	-0.20%	3.70% M		43 gl
TYPE III	720.0 lb	5796.0 lb	5815.0 lb	0.33%			
FLYASH	180.0 lb	7264.0 lb	7285.0 lb	> 0.29%			
AEA	9.00 oz	72.45 oz	72.00 oz	-0.62%			
PLAST	3.00 /C	217.35 oz	217.00 oz	-0.16%			
→ 6100	10.50 /C #	760.73 oz	759.00 oz	-0.23%			
DCI	5.0 gl	40.3 gl	40.0 gl	-0.62%			
WATER	28.00 gl	176.58 gl	176.00 gl	-0.33%		176.00 gl	

HRWR increased 13.4 oz/yd³

Actual Load	30893 lb	Slump:	5.00 in	Num Batches:	2	Design Water in	0.260	Water/Cemen	0.258 T	Design Adjust Water:	0.0 gl /	Actual Trim Water:	0.0 gl /	Manual To Add:	224.6 gl	CY Note:	Manua
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Load Completed Load Time: 7 : 59 ---Tares-----

Sikadur® 32, Hi-Mod

High-modulus, high-strength, epoxy bonding/grouting adhesive

Construction

Description	Sikadur 32, Hi-Mod, is a multi-purpose, 2-component, 100% solids, moisture-tolerant structural epoxy adhesive. It conforms to the current ASTM C-881, Types I, II, and V, Grade-2, Class C and AASHTO M-235 specifications.
Where to Use	<ul style="list-style-type: none"> ■ Bond fresh, plastic concrete to hardened concrete and steel. ■ Grout horizontal cracks in structural concrete and wood by gravity feed. ■ Machinery and 'robotic' base-plate grout. ■ Structural adhesive for concrete, masonry, metal, wood, etc.
Advantages	<ul style="list-style-type: none"> ■ Super-strength bonding/grouting adhesive. ■ Tolerant to moisture before, during and after cure. ■ Excellent adhesion to most structural materials. ■ Convenient easy-to-mix ratio A:B = 1:1 by volume. ■ Easy-to-use for bonding/grouting applications. ■ Fast initial set; rapid gain to ultimate strengths. ■ USDA-certified for use in food plants.
Coverage	<p>Bonding Adhesive - 1 gal. covers approximately 80 sq. ft. on smooth surface.</p> <p>Base Plate Grout - 1 gal. mixed with 1.5 parts oven-dried aggregate by loose volume yields approximately 420 cu. in. of grout.</p> <p>Anchoring grout - 1 gal. yields 231 cu. in. of grout.</p>

Typical Data (Material and curing conditions @ 73°F (23°C) and 50% R.H.)

RESULTS MAY DIFFER BASED UPON STATISTICAL VARIATIONS DEPENDING UPON MIXING METHODS AND EQUIPMENT, TEMPERATURE, APPLICATION METHODS, TEST METHODS, ACTUAL SITE CONDITIONS AND CURING CONDITIONS.

Shelf Life	2 years in original, unopened containers.		
Storage Conditions	Store dry at 40°-95°F (4°-35°C). Condition material to 65°-75°F (18°-24°C) before using.		
Color	Concrete gray		
Mixing Ratio	Component 'A': Component 'B' = 1:1 by volume.		
Viscosity	Approximately 3,000 cps.		
Pot Life	Approximately 30 minutes. (60 gram mass). Approximately 22 minutes. (350 gram mass, 8 oz.)		
Contact Time	40°F (4°C)*: 12 hrs.	73°F (23°C)*: 3-4.5 hrs.	90°F (32°C)*: 1.5-2 hrs
Compressive Modulus, psi	7 day	2.1 X 10 ⁵ psi (1,449 MPa)	
Tensile Properties (ASTM D-638)			
	7 day	Tensile Strength	6,900 psi (48 MPa)
		Elongation at Break	1.9%
	14 day	Modulus of Elasticity	5.4 X 10 ⁵ psi (3,726 MPa)
Flexural Properties (ASTM D-790)			
	14 day	Flexural Strength (Modulus of Rupture)	7,000 psi (48.3 MPa)
		Tangent Modulus of Elasticity in Bending	6.9 X 10 ⁵ psi (4,800 MPa)
Shear Strength (ASTM D-732)	14 day	Shear Strength	6,200 psi (43 MPa)
Water Absorption (ASTM D-570)	7 day	(24 hour immersion)	0.21%
Heat Deflection Temperature (ASTM D-648)			
	7 day	[fiber stress loading 264 psi (1.8 MPa)]	122°F (50°C)
Bond Strength (ASTM C-882):			
	2 day (moist cure)	Plastic Concrete to Hardened Concrete	1,700 psi (11.7 MPa)
		Hardened Concrete to Hardened Concrete	2,000 psi (13.8 MPa)
		Hardened Concrete to Steel	1,900 psi (13.1 MPa)
	14 day (moist cure)	Plastic Concrete to Hardened Concrete	2,200 psi (15.1 MPa)
		Plastic Concrete to Steel	2,000 psi (13.8 MPa)
		Hardened Concrete to Hardened Concrete	2,000 psi (13.8 MPa)

Compressive Properties (ASTM D-695)

Compressive Strength, psi (MPa)	40°F* (4°C)	73°F* (23°C)	90°F* (32°C)
8 hour	-	140 (1.0)	1,700 (11.7)
16 hour	-	4,800 (33.1)	7,300 (50.3)
1 day	30.0 (0.2)	5,700 (39.3)	7,300 (50.3)
3 day	5,300 (36.6)	11,300 (77.9)	10,400(71.7)
7 day	9,600 (66.2)	11,800 (81.4)	10,400(71.7)
14 day	11,900 (82.1)	12,200 (84.1)	10,400(71.7)
28 day	12,600 (86.9)	12,200 (84.1)	10,500(72.4)

*Material cured and tested at the temperatures indicated.



Packaging	1, 2 and 4 gal. units.
How to Use	Surface must be clean and sound. It may be dry or damp, but free of standing water. Remove dust,
Surface Preparation	laitance, grease, curing compounds, impregnations, waxes and any other contaminants. Preparation Work: Concrete - Should be cleaned and prepared to achieve a laitance and contaminant free, open textured surface by blastcleaning or other equivalent mechanical means. Steel - Should be cleaned and prepared thoroughly by blastcleaning.
Mixing	Pre-mix each component. Proportion equal parts by volume of Component 'A' and Component 'B' into clean pail. Mix thoroughly for 3 minutes with Sika paddle on low-speed (400-600 rpm) drill until blend is a uniform color. Mix only that quantity that can be applied within its pot life.
Application	To bond fresh concrete to hardened concrete - Apply by brush, roller, broom or spray. Place fresh concrete while Sikadur 32, Hi-Mod, is still tacky. If coating becomes glossy and loses tackiness, remove any surface contaminants then recoat with additional Sikadur 32 Hi-Mod, and proceed. To grout baseplates - Add up to 1 1/2 parts of oven-dried aggregate to 1 part of mixed Sikadur 32, Hi-Mod, by volume. Place grout under baseplate. Avoid contact with the underside of the plate. A 1/4 to 3/8 in. (6 to 10 mm) space should remain between the top of the grout and the bottom of the plate. Maximum thickness of grout per lift is 1.5 in. (38 mm) If multiple lifts are needed, allow preceding layer to cool to touch before applying additional layer. The remaining 1/4 to 3/8 in. (6 to 10 mm) space should be filled with neat Sikadur 32 Hi-Mod. Pour a sufficient quantity of neat epoxy to allow the level to rise slightly higher than the underside of the bearing plate. To gravity feed cracks - Pour neat material into vee-notched crack. Continue placement until completely filled. Seal underside of slab prior to filling if cracks reflect through.
Limitations	<ul style="list-style-type: none"> ■ Minimum substrate and ambient temperature 40°F (4°C). ■ For spray applications, consult Technical Service at 800-933-7452. ■ Use only oven-dry aggregate. ■ Material is a vapor barrier after cure. ■ For applications on exterior, on-grade substrates, consult Technical Services at 800-933-7452. ■ Do not apply over wet, glistening surface. ■ Not an aesthetic product. Color may alter due to variations in lighting and/or UV exposure.
Warning	Component 'A' - IRRITANT; SENSITIZER - Contains epoxy resin, nonyl phenol. Can cause skin sensitization after prolonged or repeated contact. Eye irritant. May cause respiratory irritation. Harmful if swallowed. Component 'B' - CORROSIVE; IRRITANT; SENSITIZER - Contains amines, silica (quartz), and benzylalcohol nonyl phenol. Contact with eyes or skin causes severe burns. Can cause skin sensitization after prolonged or repeated contact. Skin/respiratory/eye irritant. Harmful if swallowed. Deliberate concentration of vapors of Component A or B for purposes of inhalation is harmful and can be fatal. Cured material, if sanded, may result in exposure to a chemical known to the state of California to cause cancer.
First Aid	Eyes: Hold eyelids apart and flush thoroughly with water for 15 minutes. Skin: Remove contaminated clothing. Wash skin thoroughly for 15 minutes with soap and water. Inhalation: Remove person to fresh air. Ingestion: Do not induce vomiting. In all cases, contact a physician immediately if symptoms persist.
Clean Up	Wear chemical resistant gloves/goggles/clothing. Ventilate area. In absence of adequate general and local exhaust ventilation, use a properly filled NIOSH respirator. Confine spill. Collect with absorbent material. Dispose of in accordance with current, applicable local, state and federal regulations. Uncured material can be removed with solvent. Strictly follow manufacturer's warnings and instructions for use. Cured material can only be removed mechanically.
Handling & Storage	Avoid direct contact with skin and eyes. Wear chemical resistant gloves/goggles/clothing. Use only with adequate ventilation. In absence of adequate general and local exhaust ventilation, use a properly filled NIOSH respirator. Wash thoroughly after handling product. Launder clothing before reuse. Store in a cool dry well ventilated area.

KEEP CONTAINER TIGHTLY CLOSED • KEEP OUT OF REACH OF CHILDREN • NOT FOR INTERNAL CONSUMPTION • FOR INDUSTRIAL USE ONLY

All information provided by Sika Corporation ("Sika") concerning Sika products, including but not limited to, any recommendations and advice relating to the application and use of Sika products, is given in good faith based on Sika's current experience and knowledge of its products when properly stored, handled and applied under normal conditions in accordance with Sika's instructions. In practice, the differences in materials, substrates, storage and handling conditions, actual site conditions and other factors outside of Sika's control are such that Sika assumes no liability for the provision of such information, advice, recommendations or instructions related to its products, nor shall any legal relationship be created by or arise from the provision of such information, advice, recommendations or instructions related to its products. The user of the Sika product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with the full application of the product(s). Sika reserves the right to change the properties of its products without notice. All sales of Sika product(s) are subject to its current terms and conditions of sale which are available at www.sikausa.com or by calling 800-933-7452.

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LIMITED WARRANTY: Sika warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Technical Data Sheet if used as directed within shelf life. User determines suitability of product for intended use and assumes all risks. Buyer's sole remedy shall be limited to the purchase price or replacement of product exclusive of labor or cost of labor. **NO OTHER WARRANTIES EXPRESS OR IMPLIED SHALL APPLY INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SIKASHALL NOT BE LIABLE UNDER ANY LEGAL THEORY FOR SPECIAL OR CONSEQUENTIAL DAMAGES. SIKASHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRODUCT IN A MANNER TO INFRINGE ON ANY PATENT OR ANY OTHER INTELLECTUAL PROPERTY RIGHTS HELD BY OTHERS.**

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Protectosil® Degadeck® CSS

MMA CONCRETE SYSTEM SEALER

Product Data and Test Information



PRODUCT DESCRIPTION

Protectosil Degadeck CSS is a low viscosity reactive methylmethacrylate (MMA) for use in sealing cracks in concrete structures. **Protectosil Degadeck CSS** is a two component liquid material which is catalyzed to cure into a hard methylmethacrylate (MMA) resin. The low viscosity of the **Protectosil Degadeck CSS** allows it to readily penetrate into cracks. Cracks as wide as 1/8 of an inch (3 mm) to hairline can be sealed. **Protectosil Degadeck CSS** cures within one hour and is ready for traffic at that time. The cured MMA is resistant to water, chloride ion ingress, and also alkali attack.

Protectosil Degadeck CSS penetrates into cracks, then reacts to seal against water and chloride ion intrusion. The unique MMA resin also seals sound concrete against water and chloride ion ingress. The cured MMA creates a barrier which prevents the ingress of water and water borne contaminants from entering the substrate and causing premature deterioration.

By combining the two low viscosity components of the MMA resin, **Protectosil Degadeck CSS** penetrates by gravity into even the smallest crack. The excellent adhesion and strength of the cured resin ensures a long service life

APPROPRIATE APPLICATIONS/SUBSTRATES

For use to seal cracks on cast-in-place, pre-cast, and high strength concrete as well as concrete surfaces from ingress of water and water-borne contaminants, such as chloride ions. For use on concrete bridge decks, parking garages, pedestrian walkways and other elevated concrete structures.

ADVANTAGES

Protectosil Degadeck CSS is a 100% solid reactive MMA resin with low intrinsic viscosity and excellent adhesion to concrete surfaces.

The main benefits of this product are:

- Fast Curing System
- Deep penetration into cracks
- Excellent adhesion and bond strength
- Excellent water and chloride ion screening
- Compatible with other Protectosil® Building Protection products

- UV Resistance
- Highly resistant to alkali attack

LIMITATIONS

Not intended for below-grade waterproofing of cracks under hydrostatic pressure. Should not be applied if the surface temperature is below 40°F (4°C) or above 90°F (32°C), if rain is expected within two hours following application, or if high winds or other conditions prevent proper application. If rain has preceded the application, the surface should be allowed to dry at least 24 hours.

TECHNICAL DATA

Protectosil Degadeck CSS is a liquid system catalyzed by the addition of an activator.

Color	bluish, slightly turbid liquid
Active Substance	methylmethacrylate
Active Content	100%
Solvent	none
Viscosity @ 74°F	5 - 15 cp
T _{max} @ 74°F	20 - 40 min / 212°F - 392°F
Flash point	50°F
VOC	less than 70 g/l

Tensile Strength DIN EN ISO 527	54 Mpa (7755 psi)
Elongation at Break DIN EN ISO 527	4 %
Flexural Strength DIN EN ISO 1788	2 MPa (11,900 psi)

INSTALLATION

Concrete should be allowed to cure a minimum of 28 days. Concrete repair and replacement must be completed prior to application of **Protectosil Degadeck CSS**. Patching materials, caulking, sealing material, and traffic paint must be fully cured before application.

All surfaces must be cleaned to remove all traces of dirt, dust, efflorescence, mold, salt, grease, oil asphalt, laitance, curing compounds, paint, coatings, and other foreign materials. Acceptable surface cleaning methods include shotblasting, sandblasting, waterblasting, and chemical cleaners. Do not apply to a wet substrate and allow a minimum of 24 hours drying after precipitation. Check with your Evonik Degussa Corporation representative to verify that surface preparation is adequate.

(Continued)

DO NOT ADD SOLVENTS, WATER OR OTHER MATERIAL TO THE **Protectosil Degadeck CSS** FORMULATION.

Mix the **Protectosil Degadeck CSS** containers by rolling, shaking or stirring containers prior to use. The **Protectosil Degadeck CSS** formulation should be mixed in clean containers, preferably plastic. Mix the **Protectosil Degadeck CSS** until thoroughly mixed.

After mixing, **Protectosil Degadeck CSS** is ready for the addition of the initiator. Slowly stir the **Protectosil Degadeck CSS** and add the BPO catalyst per the following temperature chart:

Application Temp	BPO catalyst (% by wt.)	Pot Life (min)	Hardening Time (min)
40°F (9°C)	7.0	15	60
50°F (9°C)	5.0	12 - 16	45 - 50
60°F (16°C)	3.0	15 - 20	45 - 50
70°F (21°C)	2.0	15 - 20	45 - 50
80°F (27°C)	1.0	20 - 25	45 - 50
90°F (32°C)	1.0	5-10	30 - 35

Stir the mixture until the BPO powder is dissolved and immediately pour the **Protectosil Degadeck CSS** on the concrete surface. Using squeegees, rollers or brooms quickly distribute the material over the concrete surface. Push material onto and into cracks to allow more material to penetrate. After approximately 10 minutes at 70°F (20°C) broadcast clean dry quartz (20 to 30 mesh), aluminum oxide or other approved medium onto the sealed surface. Distribute medium evenly over the surface at a rate of 10 to 15 pounds per 100 square feet for pedestrian traffic areas and 15 to 20 pounds for vehicular traffic areas. After approximately one hour remove any loose sand and open sealed area to traffic.

For large cracks that reflect through the slab, apply by brush or roller **Protectosil Degadeck CSS** to the underside of the slab and allow to cure before sealing top surface. On larger cracks it may be advisable to partially fill the cracks with clean dry quartz to reduce the amount of **Protectosil Degadeck CSS** needed.

Coverage rates depend on the amount and size of cracks, typical coverage is approximately 80 to 140 square feet per gallon. Exact coverage depends on the number and volume of cracks as well as the concrete porosity. It is recommended to seal cracks in the early part of the day if the concrete will be exposed to direct sunlight. As the concrete heats up it will expand and the cracks will close-up. As long as there is no dew or moisture on the decks the **Protectosil Degadeck CSS** can be used even at night.

Precautions: **Protectosil Degadeck CSS** is a flammable liquid and should be kept away from heat, sparks, open flame or other sources of ignition. The **Protectosil Degadeck CSS** containers should be kept closed when not in use and should be stored at temperatures below 75°F (24°C) and away from rain, standing water and direct sunlight. When working in an enclosed area, an air respirator should be used. Please refer to the Material Safety Data Sheet for more detailed information.

AVAILABILITY

Protectosil Degadeck CSS is available in 5 and 55 gallon (180kg) drums to approved applicators, F.O.B. to various warehouses throughout the United States. Contact your local **Protectosil** representative or your regional manager for specific cost information. You can obtain their contact information on our website, www.protectosil.com, or by calling us at 1 (800) 828-0919.

TECHNICAL SERVICE

Technical service engineers and scientists are available to answer questions about product performance, application methods and compatibility with other building materials. You can speak to one of our engineers or scientists directly by calling our toll-free number, 1 (800) 828-0919, and selecting option 1.

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PROTECTOSIL PRODUCTS ARE MANUFACTURED AT THE EVONIK CORPORATION THEODORE, ALABAMA, PLANT UNDER A QUALITY SYSTEM CERTIFIED TO ISO-9001 AND ISO-14001 REQUIREMENTS.

For more information, MSDS and the most updated product information, and to find your local representative, go to www.protectosil.com

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CASTLETON BRIDGE
JPC # 23456-015

CHECK BEAM STRESSES

28 D $f'_c = 10000$ PSI OR $f'_c = 7000$ PSI
WIDTH $8'-2\frac{1}{4}"$ $f_{LL} = 1500$ PSF

SECTION PROPERTIES FOR 8'-0" WIDE BEAM (N APPLICATION)

$A = 1396$ in²
 $\gamma_b = 18.06"$
 $I_x = 8620$ in⁴
 $S_b = 4742$ in³
WT 1402 PLF

MEMBER MOMENT 803 K-FT
NON COMPOSITE SRL 177 K-FT
COMPOSITE DCM 275 K-FT
LL + E M 1297 K-FT

ASSUME 10% LOSS
REINFORC

RELEASE

C MIDDLE 44 STRAINS PULL TO 44^K EACH $P_c = 0.9 \times 44 \times 44 = 1742$ K
C ENDS 30 STRAINS PULL TO 44^K EACH $P_c = 0.9 \times 30 \times 44 = 1180$ K
 $\bar{x} = 7.03'$ UN C END FROM MID $e = 18.06 - 7.03 = 11.03"$

$$\bar{x}_{MIDSPAN} = \frac{6 @ 2\frac{1}{2} + 10 @ 4\frac{1}{2} + 10 @ 6\frac{1}{2} + 10 @ 8\frac{1}{2} + 8 @ 10\frac{1}{2}}{44}$$

$$= \frac{294}{44} = 6.68"$$

$Q_{MIDSPAN} = 18.06 - 6.68 = 11.38"$

SERVICE

STRAIN FORCE @ SERVICE

C MIDDLE $P = 44 \times 44 \times 0.8 = 1549$ K, ASSUME 20% LOSS
C ENDS $P = 30 \times 44 \times 0.8 = 1056$ K, ASSUME 20% LOSS

STRESSES, PSI (+COMP, -TEN)

LOAD	TENSION AT CRACKS P=P ₀		MIDSPAN CRACKS P=P ₀		MIDSPAN TOP STRESS RESERVE P=P
	f _b	f _t	f _b	f _t	f _t
P/A	+1883	+883	+1297	+1297	+1151
P ₀ /S	+2763	-1520	+4181	-2300	+2045
M _d /S	-290	+160	-2032	+1118	+1118
M _{sd} /S					+383**
M _{usc} /S					+1805**
TOT	+3354	-477	+3443	+1118	+2412

EVALUATION AT SERVICE IS CONSERVATIVE AS EFFECT OF INTEGRAL ABUTMENT IS NEGLECTED.

ALLOW 0.6 x 7500 + 4500 o.k. 7.5 √7500 = -650 o.k.*
 [0.6 x 7000 = 4200 o.k.] [7.5 √7000 = 627 o.k.*]
 0.1K, 0.1K, 0.4 x 10000 = 4000 o.k., 0.4 x 7000 = 2800 o.k.

TENSION AT 11 50' = 50 x 0.6 = 30' = 2.5' FROM CRACK

$$M_{SELF} \text{ w/ } e \text{ FROM TENSION AT } = \frac{W \times (L-x)}{2} ; L = 68'-0"$$

$$= \frac{1402 \times 2.5 (68-2.5)}{2} = 114789 \text{ LB-FT}$$

* REINFORCING @ TOP FLANGE REQD IF $f_t > 7.5 \sqrt{f'_c}$

$$c = \frac{477}{3354 + 477} (28) = 3.48''$$

$$T = \frac{3.48 \times 477 \times 96}{2} = 79678 \text{ LB}$$

FOR RENT @ 24 KSI

$$A = \frac{79678}{24000} = 3.32 \text{ in}^2$$

$$A_{SUPPLIED} = 24 \#6 = 10.56 \text{ in}^2 >> 3.32 \text{ in}^2 \text{ o.k.}$$

**BASED ON NON-COMPOSITE PROPERTIES, CONSERVATIVE