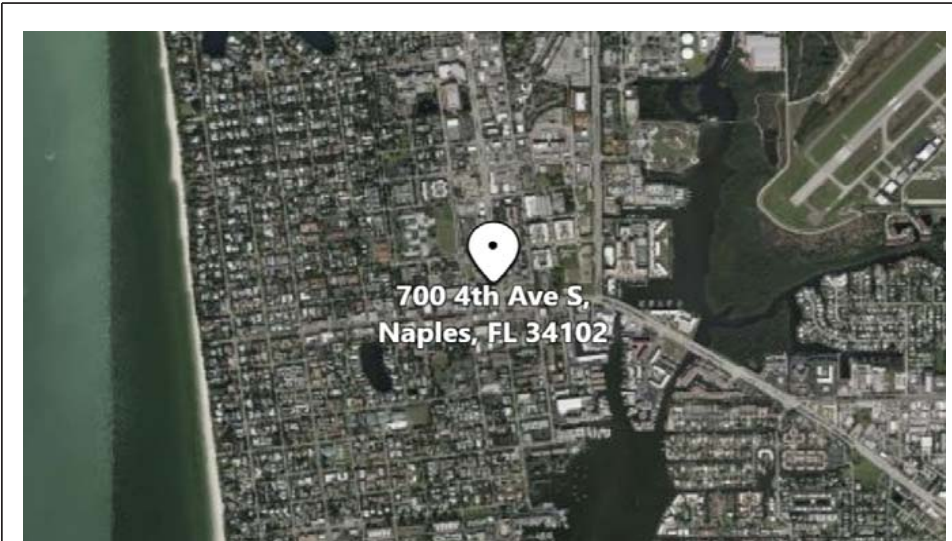


# CITY OF NAPLES PARKING GARAGE RESTORATION PROJECT

**Existing Structures**  
**ENGINEERING**  
102 Columbia Drive, Suite 105  
Cape Canaveral, FL 32920  
(321) 784-5811




Location Map  
700 4th Ave S, Naples FL 34102

### Index of Sheets

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5. Expansion Joint Repair Details Cont.
6. Joint Sealant Repair Details
7. Products Details
8. CFRP Specifications (Appendix AA)

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James B Evetts  
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FL PE #37261

3/30/2022		
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1	Added "CFRP Biscuits"	3/9/2023

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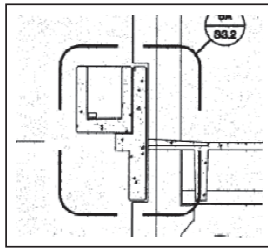
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**PARKING GARAGE**

Cover Page

1 of 7

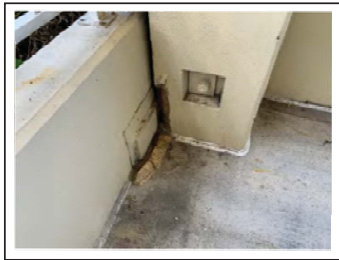
**CITY OF NAPLES 8TH STREET PARKING GARAGE LAYOUT**



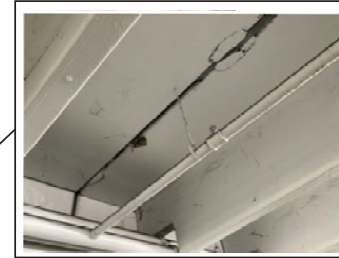
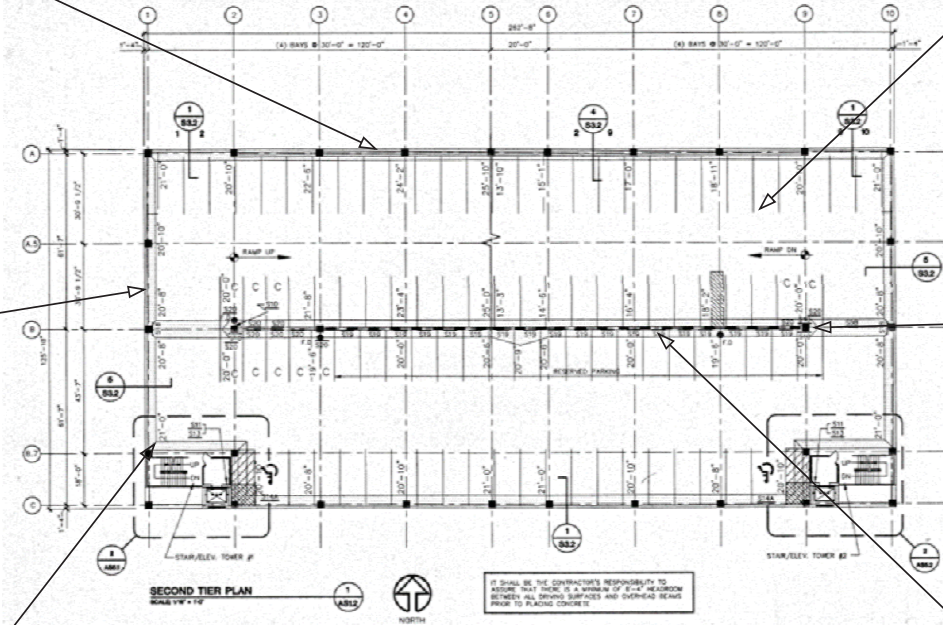
Item: 5.3.1 & 5.3.2



Item: 1: 5.2.1



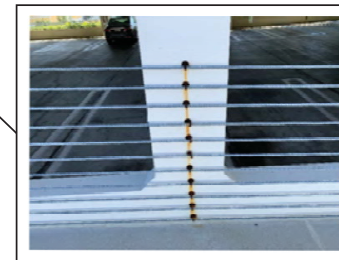
Item: 5.1.1 and 5.2.1



Item: 5.1.1 & 5.1.3



Item: 5.4.1



Item: 5.4.2

**SUMMARY OF WORK AND QUANTITIES**

**5.1. Concrete Elements (see sheet 3 of 7)**

1. Priority – Repair ~ 30 areas of loose concrete spalling in the overhead and on column to beams. It is especially important to see that loose debris is removed frequently to avoid damage to vehicles or injuries.
2. Routine – Remove ~20 pop-outs at double-tee weldments and repair with sand aggregate epoxy.
3. Priority – Repair 407 broken weldments with CFRP biscuits, in accordance with "Appendix AA".

**5.2. Waterproofing (see sheet 6 of 7, section 7901)**

1. Routine – Remove and replace ~2300 linear feet of damaged cant bead at floor to exterior wall/parapets and replace with urethane.

**5.3. Planters (see sheet 4 of 7, section 7902)**

1. Routine – Excavate 32 planters at midspan and install ~6' of urethane caulking at expansion joint.
2. Routine – Install 24 instances of 1"-2" drain holes at midspan of planters.

**5.4. Miscellaneous**

1. Routine – Pack ~22 post tension guard cables with corrosion inhibited mortar.
2. Routine – Surface prep and paint with zinc rich spray paint ~ 22 rusted steel cable eyes on guard cables.

This structure meets or exceeds Florida Building Code, 7th Edition, including:

1. Floor Live Load: 40 psf
2. Wind Design Data:
  - a. Ultimate Design Wind Speed, Vult: 170 mph ("3 second gust")
  - b. Risk Category: II
  - c. Wind Exposure: D
  - d. Internal Pressure Coefficient: +0.55, -0.55 (Partially Enclosed)
  - e. Design Wind Pressure, P: +/- 70 psf

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**PARKING GARAGE**

Summary of Work &  
Quantities

**2 of 7**

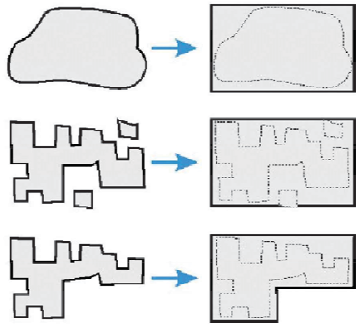


Fig. 6.1: Areas of deterioration and recommended removal configurations

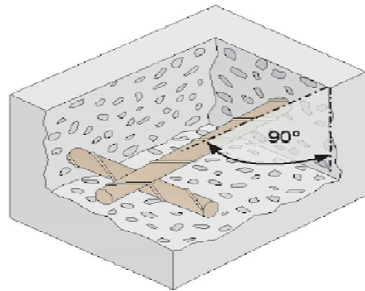


Fig. 7.2: Saw cut perimeter to provide vertical edge

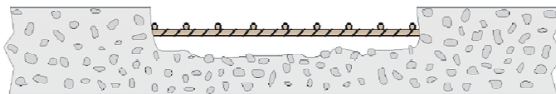


Fig. 5.1: Partial depth repair, slab or wall, section

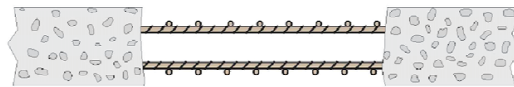


Fig. 5.2: Full depth repair, slab or wall, section

Concrete Repair Details

1. ENGINEER shall locate, identify, and mark work areas requiring repair. ENGINEER and CONTRACTOR shall review areas marked prior to removal operations.
2. Repair configurations will be simple shapes as shown in Figure 6.1.
3. Examine substrates where repairs are specified.
  - a. Repairs shall extend to sound concrete as indicated or verified by ENGINEER.

PREPARATION

4. Saw cut around the perimeter of the area to be repaired to a depth of at least 1/2 inch or greater if recommended by the repair material Manufacturer. No feathered edges permitted. Sandblast or roughen saw cut edges to promote bond with repair material. Remove loose, damaged or deteriorated concrete with spade-edged, lightweight pneumatic chipping hammer (30# or lighter) or hydro-demolition.
5. Obtain a fractured aggregate profile at the surface of the excavation. The horizontal plane formed at the bottom of the excavation shall be chipped to a near flat surface forming rectangularly shaped repair areas, as indicated on the drawings and as referenced in ICRI 310.1R. Clean steel to remove all contaminants and rust. A tight oxide remaining on steel will be acceptable. Chip back behind reinforcing steel so that the area under the rebar will be equal to or greater than 3/4 inch. Position bar so at least 1 inch of concrete coverage is maintained. Remove all loose material so no dust, latence, loose aggregate, or particles remain. Clean the area to be repaired by water blast to remove all debris.
6. Soak surfaces of excavation by ponding at least 8 hours before applying repair mortar. Allow surface to become saturated surface dry before placing patch material.
7. ENGINEER shall inspect preparation of repair surface prior to repair mortar placement to approve for concrete placement and to record volume or unit measurement of repair.
8. Mix repair material in accordance with Manufacturer's instructions (see products section). Note that Manufacturer may require addition of approved aggregate to the mortar mix.

PLACEMENT

9. Place repair material in accordance to Manufacturer's recommendations.
10. Continue expansion and/or control joints through the repair.
11. Trowel to smooth, hard troweled finish after initial set compatible with the surrounding surface and even with adjoining edges.

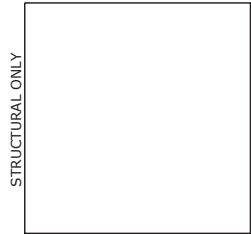
CURING

12. Protect from rain and temperatures below 40 F for not less than 24 hours.

PRODUCTS

13. Use TREMCO DYMONIC 100, DURAFLEX FASTPATCH or equal, as indicated on sheet 7 of 7.

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**PARKING GARAGE**

Concrete Repair  
 Details

**3 of 7**

SECTION 07902 – EXPANSION JOINT REPAIR

PART 1 - GENERAL

1.1 SUMMARY

- A. This specification describes the sealing of joints and cracks with a two-component, non-sag or self-leveling, elastomeric polyurethane sealant.

1.2 QUALITY ASSURANCE

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Install materials in accordance with all safety and weather conditions required by manufacturer or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.4 JOB CONDITIONS

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F (5°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified coating.

1.5 SUBMITTALS

- A. Submit two copies of manufacturer's literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDS)

1.6 WARRANTY

- A. Provide a written warranty from the manufacturer against defects of materials for a period of five (5) years, beginning with date of substantial completion of the project.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. SikaFlex-2c, as manufactured by Sika Corporation, 1682 Marion Williamsport Road, Marion, OH 43302 is considered to conform to the requirements of this specification.

2.02 MATERIALS

- A. Polyurethane sealant:
  - 1. The joint sealant shall be a two-component, non-sag or self-leveling, polyurethane-base material. It shall be applicable in horizontal, vertical, and overhead joints. The sealant shall be principally a chemical cure to form an elastomeric substance. The color shall be introduced through a "Color-pak" system or be pretinted from the manufacturer.
- B. Any primers, as required, recommended by the manufacturer of the specified product, approved by the engineer.
- C. Backer rod or bond breaker tape as approved by engineer.

2.03 PERFORMANCE CRITERIA

- A. Properties of the mixed polyurethane sealant:
  - 1. Pot Life: 3-4 hours
  - 2. Initial Cure (Tack-Free Time): 6-8 hours
  - 3. Consistency: non-sag/self-leveling
  - 4. Color: more than 300 architectural colors available through color matching system
- B. Properties of the cured polyurethane sealant:
  - 1. Tensile Properties (ASTM D-412) at 14 days Non-sag Self-Leveling
    - a. Tensile Strength at break: minimum 120 psi  
175 psi
    - b. Tensile Elongation: minimum 500%  
650%
    - c. Modulus of Elasticity - 100% Elongation 75 psi, min.  
100 psi, min.
  - 2. Shore A Hardness (ASTM D-2240) at 14 days:
    - a. Non-sag: 35 +/-5
    - b. Self-leveling: 40 +/-5
  - 3. Tear Strength (ASTM D-624) at 14 days: non-sag 45 lbs./in, self-leveling 100 lbs./in
  - 4. Adhesion in Peel (TT-S-00227E, ASTM C-794) at 21 days
    - a. Concrete: 25-lb. min. 0% Adhesion Loss
    - b. Aluminum: 30-lb. min. 0% Adhesion Loss
    - c. Glass: 30-lb. min. 0% Adhesion Loss
  - 5. Service Range: -40° to 170°F (-40° to 77°C)

- 6. The sealant shall conform to Federal Specification TT-S-00227E, Type I and II, Class A.
- 7. The sealant shall conform to ASTM C-920, Type M, Grade P or NS, Class 25.
- 8. The sealant shall be capable of ±50% of the average joint width when tested in accordance to the durability bond test of Federal Specification TT-S-00227E and ASTM C-719.
- 9. The sealant shall be non-staining.
- 10. Final Cure: 3 days max.

PART 3 - EXECUTION

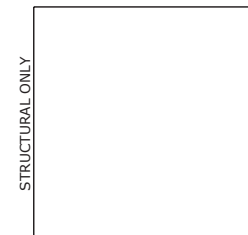
3.01 SURFACE PREPARATION

- A. The joint and adjacent substrate must be clean, dry, sound and free of surface contaminants. Remove all traces of the old sealant, dust, laitance, grease, oils, curing compounds, form release agents and foreign particles by mechanical means, i.e. – sandblasting, etc., as approved by the engineer. Blow joint free of dust using compressed air line equipped with an oil trap.

3.02 MIXING AND APPLICATION

- A. Mixing of the polyurethane sealant: Pour out entire contents of Component B into pail of Component A. Add entire contents of Color-pak into pail and mix with low-speed drill (400-600 rpm) and approved paddle. Mix for 3-5 minutes to achieve a uniform color and consistency. Avoid entrapment of air during mixing.
- B. Joints:
  - 1. Placement Procedure: Prime all substrates as required based upon the recommendations of the manufacturer of the specified product, when field testing indicates need, and when the joints will be subject to immersion after cure, as approved by the Engineer.
  - 2. Install approved backer rod or bond breaker tape in all joints subject to thermal movement to prevent three-sided bonding and to set the depth of the sealant at a maximum of 1/2 in., measured at the center point of the joint width. Approval of the backer rod or bond breaker tape shall be made by the Engineer.
  - 3. Joints shall be masked to prevent discoloration or application on unwanted areas, as directed by the Engineer. If masking tape is used, it shall not be removed before tooling, yet must be removed before the initial cure of the sealant. Do not apply the masking tape until just prior to the sealant application.
  - 4. Install sealant into prepared joints when the joint is at mid-point of its expansion and contraction cycle.
    - a. Non-sag sealant: Load the sealant into a caulking gun. Place the nozzle of the gun, either hand or air or electric powered, into the bottom of the joint and fill entire joint. Keep the tip of the nozzle in the sealant, continue with a steady flow of sealant preceding the nozzle to avoid air entrapment. Avoid overlapping the sealant to eliminate the entrapment of air. Tool, as required, to properly fill the joint.
    - b. Self-leveling sealant: Pour or extrude the sealant into the prepared joint in one direction and allow it to flow and level as necessary. Avoid overlapping the sealant to eliminate the entrapment of air. Tool as required to properly fill the joint.
- 5. Adhere to all limitations and cautions for the polyurethane sealant in the manufacturer's printed literature.

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PARKING GARAGE

Expansion Joint  
Repair Details

## B. Cracks

1. Non-sag sealant: For best performance, sealant should be gunned into crack to a minimum of 1/4" in depth. Place the nozzle of the gun, either hand or air or electric powered, into the bottom of the crack and fill entire crack. Keep the tip of the nozzle in the sealant, continue with a steady flow of sealant preceding the nozzle to avoid air entrapment. Avoid overlapping the sealant to eliminate the entrapment of air. Tool as required to properly fill the crack.
2. Self-leveling sealant: Pour or extrude the sealant into the prepared crack in one direction and allow it to flow and level as necessary. Avoid overlapping the sealant to eliminate the entrapment of air. Tool as required to properly fill the crack.
3. Adhere to all limitations and cautions for the polyurethane sealant as stated in the manufacturers printed literature.

## 3.03 CLEANING

- A. The uncured polyurethane sealant can be cleaned with an approved solvent. The cured polyurethane sealant can only be removed mechanically
- B. Leave work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

Figure 1 - Sikaflex-2c NS (non-sag) or Tremco Dymonic 100

1. Install appropriate backer material to prevent three-sided adhesion and to control sealant depth.
2. Sikaflex-2c NS should be gunned into joint at mid-point of designed expansion and contraction.
3. Tool as required to properly fill joints.

Note: Sikaflex-2c NS is designed for all types of joints where maximum sealant depth will not exceed 1/2".

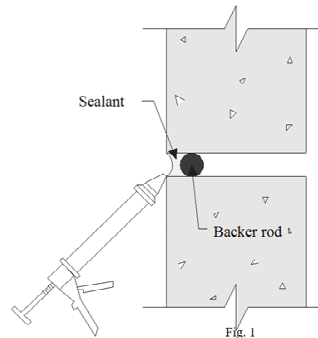


Figure 2 - Sikaflex-2c SL (self-leveling) or Tremco Dymonic 100

1. Pour Sikaflex-2c SL into prepared joint, allow to flow and level as necessary. Minimum depth 1/4" to maximum depth 1/2" for working joint. Depth can be greater in non-working joint.
2. Tool as required to properly fill joint.

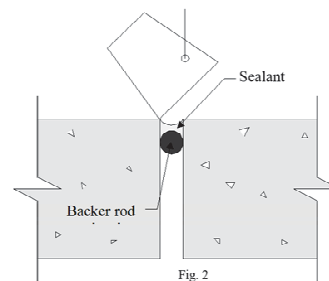
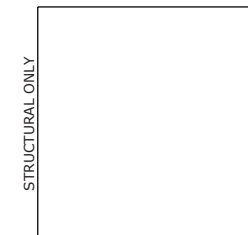


Fig. 2  
END OF SECTION 07902

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**PARKING GARAGE**

Expansion Joint  
Repair Details Cont.

5 of 7

**SECTION 07901 - JOINT SEALANTS**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes joint sealants for the following locations:
  - 1. Joints in concrete and stucco, including but not limited to window frames and door frames.

**1.3 SYSTEM PERFORMANCE REQUIREMENTS**

- A. Provide joint sealants that have been produced and installed to establish and to maintain watertight continuous seals without causing staining or deterioration of joint substrates.

**1.4 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Product data from Manufacturers for each joint sealant product required.
  - 1. Certification by joint sealant Manufacturer that sealants plus the primers and cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.
- C. Certificates from Manufacturers of joint sealants attesting that their products comply with specification requirements and are suitable for the use indicated.

**1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.
- B. Single Source Responsibility for Joint Sealant Materials: Obtain joint sealant materials from a single Manufacturer for each different product required.
- C. Inspection: Inspect installed sealant after application to assure bead has a smooth and uniform finish.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials to Project site in original unopened containers or bundles with labels indicating Manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with Manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

**1.7 PROJECT CONDITIONS**

- A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:
  - 1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant Manufacturer.
  - 2. When joint substrates are wet.
- B. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

**1.8 SEQUENCING AND SCHEDULING**

- A. Sequence installation of joint sealants to minimize collateral damage from construction activities.

**PART 2 - PRODUCTS**

**2.1 MATERIALS, GENERAL**

- A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant Manufacturer based on testing and field experience.
- B. Colors: Provide color of exposed joint sealants to comply with the following:
  - 1. Provide selections made by ENGINEER from Manufacturer's full range of standard colors for products of type indicated.
  - 2. When sealant applied to untopcoated inorganic zinc, ensure color matches that of the coating.

**2.2 JOINT SEALANTS**

- A. Sealant Standard: Provide Sika Sikaflex-1A one part polyurethane, elastomeric sealant/adhesive.

**2.3 MISCELLANEOUS MATERIALS**

- A. Primer: Material recommended by joint sealant Manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to Manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming in any way joint substrates and adjacent nonporous surfaces, and formulated to promote optimum adhesion of sealants with joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

**3.2 PREPARATION**

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant Manufacturer and the following requirements:
  - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant Manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  - 2. Clean metal surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

**3 INSTALLATION OF JOINT SEALANTS**

- A. General: Comply with joint sealant Manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.
- B. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- C. Tooling of Nonsag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant Manufacturer.

**3.4 CLEANING**

- A. Clean off excess sealants or sealant smears adjacent to joints as Work progresses by methods and with cleaning materials approved by Manufacturers of joint sealants and of products in which joints occur.

**3.5 PROTECTION**

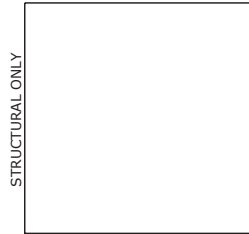
- A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original Work.

END OF SECTION 07901

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Joint Sealant Details

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**Dymonic® 100**  
High-Performance, High-Movement, Single-Component Polyurethane Sealant

**Product description**  
Dymonic 100 is a high-performance, high movement, single-component, elastomeric sealant, low VOC, UV stable, non-sag polyurethane sealant.

**Basic Uses**  
Dymonic 100 is a durable, flexible sealant that offers excellent performance in moving joints and provides excellent adhesion to a wide range of substrates. Dymonic 100 reduces expansion and contraction stress, reduces concrete joint sealant shrinkage, reduces concrete joint sealant cracking, and provides a long-lasting, durable sealant. Dymonic 100 is also an excellent choice as a final ground flange sealant for metal roofing systems for maintenance-free, clear and curtain wall applications.

**Features and Benefits**

- Can adhere to damp or moist concrete and has a skin time of 7 to 14 minutes after application.
- Movement capability of +/-100% in typical conditions, in low VOC, permanent, no-sag formula, and will not crack, water or yellow under stress.
- Superior for water retention and will not sag.
- Formulated with an innovative curing technology, sealant is formulated with UV stabilizers. Dymonic 100 is highly weatherable and has a unique capability to adhere to damp or moist concrete and metal panels.
- Compatible and can be used in conjunction with Tremco's Vulcan Deck Coatings, Flashing and Primer products and the Pro-Seal System (TSP) for line of yellow-grease waterproofing products.
- Accepts color pigments for each color. Naples (see color chart) (C)

**SEALANT-WATERPROOFING RESTORATION INSTITUTE**  
Product: Dymonic 100  
Cure Time: 7 to 14 min. (skin time)  
Adhesive: Metal, Structural Concrete, Unfinished Concrete, Brick, Masonry, Drywall, Gypsum Board, Glass, Stone, etc.  
Validation Date: 2/25/19 - 2/25/24  
SEALANT VALIDATION  
www.tremco.com

**Availability**  
Dymonic 100 is immediately available from your local Tremco Sales Representative, distributor or warehouse.

**Coverage Factor**  
300 sq. ft. per gallon (at 1/16" x 1/4" x 1/4" in 4 min. joint). For specific coverage rates for various joint sizes, and usage information, visit our website: [www.tremco.com](http://www.tremco.com).

**Packaging**

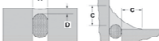
- 10 gal (200-kg) cartons
- 25 gal (500-kg) kettles

**Colors**  
Almond, Aluminum, Blue, Red, Red Aluminum, Bronze, Black, Brown, Red, Dark Brown, Olive, Green, Grey, Green, Marine, Green, Yellow, Light Brown, Lavender, Natural Clay, Off White, Pearls, White, Richwood Tan, Sandstone, Stone, and White.

**Shelf Life**  
1 year when stored at 65 to 75°F (15 to 25°C).

**Dymonic® 100**  
High-Performance, High-Movement, Single-Component Polyurethane Sealant

Tremco recommends that surface temperatures be 40°F (5°C) or above at the time the sealant is applied. Installation should be applied to temperatures below 40°F, please refer to the Tremco Technical Bulletin on Applying Sealants in Cold Conditions (No. 32-34) at [www.tremco.com](http://www.tremco.com).



**Priming**  
Dymonic 100 greatly adheres to common construction substrates without primers. Adhesive strength may require the use of primer. However, Tremco provides a complete line of primers for these substrates to be performed on the job site materials being used on the job. For more information, please visit [www.tremco.com](http://www.tremco.com). An application of the sealant should be made to the joint at a depth of 1/16" (1.6 mm) and a minimum depth of 1/4" (6.4 mm) and a maximum depth of 1/2" (12.7 mm). For joint sealant depth, refer to the Tremco Technical Service or your local Tremco Sales Representative.

**Weather Protection**  
Weather Protection: To block drafts, or to help reduce air flow, sealants and tapes should be applied to the joint in a weather-resistant manner. The sealant should be applied to the joint in a weather-resistant manner. The sealant should be applied to the joint in a weather-resistant manner.

**Cure Time**  
Dymonic 100 generally cures at a rate of 1/16" (1.6 mm) per day. At 75°F (25°C) and 50% RH, it will cure in 24 to 48 hours. At 65°F (18°C), the cure time will increase to 48 to 72 hours. At 55°F (14°C), the cure time will increase to 72 to 96 hours. At 45°F (7°C), the cure time will increase to 96 to 120 hours. At 35°F (2°C), the cure time will increase to 120 to 144 hours. At 25°F (-7°C), the cure time will increase to 144 to 168 hours. At 15°F (-10°C), the cure time will increase to 168 to 192 hours. At 5°F (-20°C), the cure time will increase to 192 to 216 hours.

**Warranty**  
Tremco warrants its Products to be free of defects in materials or workmanship when properly installed and used in accordance with the instructions on the product. This warranty does not cover any damage caused by improper installation or use. For more information, please visit [www.tremco.com](http://www.tremco.com).

**Joint Backing**  
Polyethylene backer rod is recommended as joint backing to control shrinkage and expansion. Tremco provides a complete line of backer rods to be used on the job site. For more information, please visit [www.tremco.com](http://www.tremco.com).

**Sealant Application**  
Sealant should be applied to the joint in a weather-resistant manner. The sealant should be applied to the joint in a weather-resistant manner. The sealant should be applied to the joint in a weather-resistant manner.

**Sealant Disposal**  
Sealant should be disposed of in accordance with local regulations. For more information, please visit [www.tremco.com](http://www.tremco.com).

**Dymonic® 100**  
High-Performance, High-Movement, Single-Component Polyurethane Sealant

**TYPICAL PHYSICAL PROPERTIES**

PROPERTY	TEST METHOD	TYPICAL VALUES
Color	Visual	Color: color-coded to match substrate
Cure Time	ASTM D2240	24 to 48 hours
Shrinkage	ASTM D2240	0.1 to 0.2%
Adhesive Properties	ASTM D2240	100% adhesion to most substrates
Flexibility	ASTM D2240	±100% elongation
Temperature Range	ASTM D2240	-40 to 180°F (-40 to 80°C)
UV Resistance	ASTM D2240	Excellent
Water Resistance	ASTM D2240	Excellent
Chemical Resistance	ASTM D2240	Excellent
Acid Resistance	ASTM D2240	Excellent
Alkali Resistance	ASTM D2240	Excellent
Oil Resistance	ASTM D2240	Excellent
Grease Resistance	ASTM D2240	Excellent
Flame Retardance	ASTM D2240	Excellent
Smoke Density	ASTM D2240	Excellent
Fire Resistance	ASTM D2240	Excellent
Sound Dampening	ASTM D2240	Excellent
Impact Resistance	ASTM D2240	Excellent
Compression Set	ASTM D2240	Excellent
Modulus	ASTM D2240	Excellent
Elongation	ASTM D2240	Excellent
Tensile Strength	ASTM D2240	Excellent
Tensile Elongation	ASTM D2240	Excellent
Shear Strength	ASTM D2240	Excellent
Peel Strength	ASTM D2240	Excellent
Adhesion to Concrete	ASTM D2240	Excellent
Adhesion to Steel	ASTM D2240	Excellent
Adhesion to Aluminum	ASTM D2240	Excellent
Adhesion to Masonry	ASTM D2240	Excellent
Adhesion to Brick	ASTM D2240	Excellent
Adhesion to Glass	ASTM D2240	Excellent
Adhesion to Gypsum	ASTM D2240	Excellent
Adhesion to Plaster	ASTM D2240	Excellent
Adhesion to Drywall	ASTM D2240	Excellent
Adhesion to Wood	ASTM D2240	Excellent
Adhesion to PVC	ASTM D2240	Excellent
Adhesion to HDPE	ASTM D2240	Excellent
Adhesion to LDPE	ASTM D2240	Excellent
Adhesion to PP	ASTM D2240	Excellent
Adhesion to PS	ASTM D2240	Excellent
Adhesion to PE	ASTM D2240	Excellent
Adhesion to PU	ASTM D2240	Excellent
Adhesion to PC	ASTM D2240	Excellent
Adhesion to PMMA	ASTM D2240	Excellent
Adhesion to ABS	ASTM D2240	Excellent
Adhesion to PC/ABS	ASTM D2240	Excellent
Adhesion to PA6	ASTM D2240	Excellent
Adhesion to PA66	ASTM D2240	Excellent
Adhesion to PA12	ASTM D2240	Excellent
Adhesion to PA11	ASTM D2240	Excellent
Adhesion to PA9	ASTM D2240	Excellent
Adhesion to PA610	ASTM D2240	Excellent
Adhesion to PA612	ASTM D2240	Excellent
Adhesion to PA614	ASTM D2240	Excellent
Adhesion to PA616	ASTM D2240	Excellent
Adhesion to PA618	ASTM D2240	Excellent
Adhesion to PA620	ASTM D2240	Excellent
Adhesion to PA622	ASTM D2240	Excellent
Adhesion to PA624	ASTM D2240	Excellent
Adhesion to PA626	ASTM D2240	Excellent
Adhesion to PA628	ASTM D2240	Excellent
Adhesion to PA630	ASTM D2240	Excellent
Adhesion to PA632	ASTM D2240	Excellent
Adhesion to PA634	ASTM D2240	Excellent
Adhesion to PA636	ASTM D2240	Excellent
Adhesion to PA638	ASTM D2240	Excellent
Adhesion to PA640	ASTM D2240	Excellent
Adhesion to PA642	ASTM D2240	Excellent
Adhesion to PA644	ASTM D2240	Excellent
Adhesion to PA646	ASTM D2240	Excellent
Adhesion to PA648	ASTM D2240	Excellent
Adhesion to PA650	ASTM D2240	Excellent
Adhesion to PA652	ASTM D2240	Excellent
Adhesion to PA654	ASTM D2240	Excellent
Adhesion to PA656	ASTM D2240	Excellent
Adhesion to PA658	ASTM D2240	Excellent
Adhesion to PA660	ASTM D2240	Excellent
Adhesion to PA662	ASTM D2240	Excellent
Adhesion to PA664	ASTM D2240	Excellent
Adhesion to PA666	ASTM D2240	Excellent
Adhesion to PA668	ASTM D2240	Excellent
Adhesion to PA670	ASTM D2240	Excellent
Adhesion to PA672	ASTM D2240	Excellent
Adhesion to PA674	ASTM D2240	Excellent
Adhesion to PA676	ASTM D2240	Excellent
Adhesion to PA678	ASTM D2240	Excellent
Adhesion to PA680	ASTM D2240	Excellent
Adhesion to PA682	ASTM D2240	Excellent
Adhesion to PA684	ASTM D2240	Excellent
Adhesion to PA686	ASTM D2240	Excellent
Adhesion to PA688	ASTM D2240	Excellent
Adhesion to PA690	ASTM D2240	Excellent
Adhesion to PA692	ASTM D2240	Excellent
Adhesion to PA694	ASTM D2240	Excellent
Adhesion to PA696	ASTM D2240	Excellent
Adhesion to PA698	ASTM D2240	Excellent
Adhesion to PA700	ASTM D2240	Excellent

\*For temperatures below 40°F, please refer to the Technical Bulletin, Cold Temperature Sealant Application Recommendations.

**0310100001**  
Tremco Commercial Sealants & Waterproofing

12015 Redwood Road - Cleveland, OH 44110  
888.571.3628 F - 216.511.6666 F  
[www.tremco.com](http://www.tremco.com)

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**DURALFLEX FASTFATCH**  
Low Modulus Epoxy Repair Mortar Kit

**DESCRIPTION**  
DURALFLEX FASTFATCH is a three-component, 100% solids, low modulus, moisture insensitive, epoxy repair kit designed to provide a high strength, water resistant surface to worn and damaged high rise floors. DURALFLEX FASTFATCH can be covered with EUCOLD UNIVERSAL COLOR PRACTIS, available in 33 different colors.

**PREMIUM APPLICATIONS**

- Warehouse floors
- Loading docks
- Mechanical rooms
- Parking decks and ramps

**FEATURES/BENEFITS**

- No measuring of components
- Pre-mixed resin, hardener and sand and specially blended "non-shrink" aggregate
- Low modulus resin binder used for stress relief and resistance to impact
- Resistant to thermal and mechanical movements
- Rapid cure, minimizes down time
- May be applied as low as 40°F (4°C)
- 33 colors available using color packs

**TECHNICAL INFORMATION**  
The following are typical values obtained under laboratory conditions. Expect reasonable variations under field conditions.

Put Life, Min. minutes	20 to 30	Effective Shrinkage, ASTM C826	0.002 to 0.003
Initial Cure, 1/2" (13 mm) thick	3 to 4	Adhesion to Concrete	Concrete failure
Tensile Strength, ASTM C672, psi (MPa)	2,700 (18.6)	Compressive Strength, psi (MPa), ASTM C109	8000 (55.2)
Tensile Elongation, %	43	Ductility	200%
Flexural Strength, ASTM C672, psi (MPa)	1,250 (8.6)	4 hours	4,000 (27.6)
Hardness, Shore D, max. ASTM D2240	85	6 hours	4,000 (27.6)
Water Absorption, ASTM D553, %	<0.5	12 hours	4,000 (27.6)
Thermal Compatibility, ASTM C826	pass	3 days	4,000 (27.6)

**PACKAGING**  
DURALFLEX FASTFATCH is packaged in a 5.4 (211 ml) kit consisting of premeasured components of Part A (Resin), Part B (Hardener) and Part C (Aggregate) contained in a 3.0 gal (113 L) bucket.

**SHELF LIFE**  
2 years in original, unopened containers.

**SPECIFICATIONS/COMPLIANCE**  
DURALFLEX FASTFATCH PART A & PART B: ASTM C881, Type III, Grade 1, Classes A & B  
Canadian Food Inspection Agency compliant

**12015 Redwood Road - Cleveland, OH 44110**  
888.571.3628 F - 216.511.6666 F  
[www.tremco.com](http://www.tremco.com)

**COVER AND LIST**  
One kit covers 4 to 6 (100 to 150) sq. ft. Applied at 1/4" to 3/8" (6 to 10 mm) thickness, one kit will cover approximately 10 to 20 sq. ft. (3 to 6 sq. m).

**APPLICATIONS/INSTRUCTIONS**  
Surface Preparation: Concrete surfaces must be structurally sound, free of loose or deteriorated concrete and free of dirt, oil, grease, efflorescence, and all other contaminants. Mechanically abrade the surface to achieve a surface profile equal to CSP 3, as in accordance with ICR 4108.3.2.2. Any exposed steel must be cleaned to a "white" metal finish.

Mixing: Remove the contents from the DURALFLEX FASTFATCH kit. Pre-mix one container (Part A & B) and Part B thoroughly separately. Pour the entire contents of Part A and Part B into the supplied pail. Mix thoroughly using a slow speed "1" and a "2" stirrer. Mix for 3 minutes. Taper side to taper the bottom and avoid mixing container while mixing. Do not whip air into the product while mixing. Gradually add the supplied aggregate to pre-mixed epoxy and blend thoroughly. BE SURE TO MIX THE EPOXY THOROUGHLY BEFORE RASING THE AGGREGATE.

Application: For best results, conduct the DURALFLEX FASTFATCH to 75°F (23°C) for at least 24 hours prior to application. Apply epoxy repair kit immediately after mixing with a trowel or broom. Material should be contained into a dry surface for best adhesion. Trowel the material against the edge and gradually work toward the center of the repair area. Immediately after the mortar has been placed, aggregate can be broadcast into the wet finish to provide a rough finished floor. Minimum application thickness of DURALFLEX FASTFATCH is 1/4" (6 mm); the maximum depth is 3" (7.6 cm).

Equal Universal Color Packs: DURALFLEX FASTFATCH can be colored using EUCOLD UNIVERSAL COLOR PRACTIS EUCOLD PRACTIS wet mix. Prior to mixing the wet mix together with aggregate, use EUCOLD UNIVERSAL COLOR PRACTIS available in 33 different colors. Use EUCOLD UNIVERSAL COLOR CHART for available colors.

**CLEAN-UP**  
Clean tools and application equipment immediately after use with methyl ethyl ketone or acetone. Clean spills or areas which will mix with some solvent. Once DURALFLEX FASTFATCH has cured, mechanical abrasion for removal.

**PRECAUTIONS/LIMITATIONS**

- Store at temperature between 50°F to 90°F (10°C to 32°C)
- Do not apply at application temperatures below 40°F (4°C)
- The material should be conditioned at 75°F (23°C) when used for low temperature applications.
- This material should not be exposed to water during cure.
- If the repaired area is to be exposed to severe chemical abuse, it should be top coated with a chemical resistant coating from Eucold Chemical.
- Do not waste during mixing.
- In all cases, consult the Safety Data Sheet before use.

STRUCTURAL ONLY

NON-FLAMMABLE

DURALFLEX FASTFATCH

MADE IN THE USA

James Byron Everts  
FL PE #37261

3/30/2022

Rev #	Detail	Date
1	Added "CFRP Biscuits"	3/9/2023

This item has been digitally signed and sealed by James B. Everts, PE on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

700 S 4th Ave, Naples, Florida 34102

PARKING GARAGE

Products Details

7 of 7



# **Appendix AA**

## **CFRP Specification**





Fiber Reinforced Polymer (FRP) Tee to Tee Shear Connector Repair  
Section TBD

**1 GENERAL**

**1.1 DESCRIPTION OF WORK**

- .1 This specification is intended to define the minimum requirements of structural repair of existing shear connectors
- .2 The work includes the furnishing of all materials, labor, equipment and services for the supply, installation and finish of adhesively bonded Fiber Reinforced Polymer (FRP) tee to tee shear connectors.
- .3 The general contractor or subcontractor shall furnish all materials, tools, equipment, transportation, necessary storage, access, labor and supervision required for the proper installation of the adhesively bonded Fiber Reinforced Polymer (FRP) tee to tee shear connectors.

**1.2 WORK INCLUDED**

- .1 This Section of the Specification is not necessarily complete in itself and must be administered in conjunction with the Contract Drawings.

**1.3 REFERENCE STANDARDS**

General

The publications listed below form a part of this specification to the extent referenced. Where a date is given for referenced standards, the edition of that date shall be used. Where no date is given for reference standards, the latest edition available on the date of the Drawings shall be used.

Canadian Standards Association (CSA)

American Standard for Testing and Materials (ASTM)

International Federation of Structural Concrete

American Concrete Institute (ACI)

**1.4 MATERIAL QUALIFICATIONS**

- .1 Materials for the adhesively bonded Fiber Reinforced Polymer (FRP) tee to tee shear connectors have been pre-qualified and shall be supplied by:





V2 Structural Systems  
770 Lee Road 191  
Auburn, AL 36830  
Tel: 334-502-3000

- .2 Alternate materials are not acceptable at this time.

## 1.5 SUBMITTALS

Quality Control and Quality Assurance:

Design and working drawings:

- .1 The application contractor shall submit proposed layout of all connectors.

Product Information:

- .2 Manufacturer's product data sheet indicating physical, mechanical and chemical characteristics of all materials used in the adhesively bonded Fiber Reinforced Polymer (FRP) tee to tee shear connectors.
- .3 Installation procedures, maintenance instructions, and general recommendations regarding Fiber Reinforced Polymer (FRP) tee to tee shear connectors.
- .4 Manufacturer's Material Safety Data Sheets (MSDS) for all materials to be used.

## 1.6 PRODUCT DELIVERY, HANDLING AND STORAGE

- .1 Deliver adhesively bonded Fiber Reinforced Polymer (FRP) tee to tee shear connectors and materials in factory-sealed containers with the manufacturer's labels intact and legible with verification of date of manufacture and shelf life.
- .2 Store materials in a protected area at a temperature between 50°F (10°C) and 90°F (32°C).
- .3 Products shall be stored according to the manufacturer's requirements and shall avoid contact with soil and moisture.
- .4 Adhesively bonded Fiber Reinforced Polymer (FRP) tee to tee shear connectors and epoxy products shall be stored to avoid UV exposure.

## 1.7 COORDINATION WITH OTHER TRADES

- .1 Prior to construction, the trades shall be briefed on any new or unusual construction procedures to ensure that they are aware of special conditions (e.g. new penetrations).



## 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS & COMPOSITE STRENGTHENING SYSTEM

#### .1 V2 Structural Systems T- Biscuits to be supplied by

V2 Composites  
770 Lee Road 191  
Auburn, AL 36830  
Tel: 334-502-3000

#### .2 System components:

- a. Fiber Reinforced Polymer (FRP) tee to tee shear connectors: T- Biscuits
- b. Epoxy Adhesive: Biscuit Bond paste

### 2.2 CERTIFIED APPLICATORS

#### .1 Installation of the V2 Structural System T biscuits shall be performed by certified applicators only. Certified applicators shall have the minimum experience and consent as recommended by the manufacturer (See Sections 1.5.4 & 1.5.16 of this specification).

### 2.3 OTHER MATERIALS

#### .1 Contractor to provide compatible repair mortars and other materials recommended by the manufacturer as needed for the proper installation of the complete Fiber Reinforced Polymer (FRP) tee to tee shear connector system.

## 3 INSTALLATION

### .1 Installation procedure per manufacture's recommendation or as follows:

#### .1 Shear connector layout

#### .2 Determine the location of the existing steel flange connectors and mark on top deck surface.

#### .2 Lay out the Biscuit locations in accordance with the Q.



## 1) Quantity and Location

**Qty of CFRP Biscuit**

<b>QTY</b>	<b>TIER</b>	<b>LANE</b>	<b>COLUMN LINE</b>
11	2	A-B	5.5
11	2	B-C	2.7
11	2	B-C	3.3
11	2	B-C	4
11	2	B-C	4.3
11	2	B-C	4.7
11	2	B-C	5.5
11	2	B-C	6
11	2	B-C	6.7
11	2	B-C	7
11	2	B-C	7.3
11	2	B-C	8
11	2	B-C	8.7
11	3	A-B	2.7
11	3	A-B	3
11	3	A-B	3.7
11	3	A-B	4
11	3	A-B	5
11	3	A-B	5.5
11	3	A-B	6.7
11	3	A-B	7
11	3	A-B	7.3
11	3	B-C	4
11	3	B-C	4.3
11	3	B-C	4.7
11	3	B-C	6.3
11	3	B-C	8
11	4	A-B	3.3
11	4	A-B	4
11	4	A-B	4.3
11	4	A-B	4.7
11	4	A-B	5.5
11	4	A-B	7
11	4	B-C	4
11	4	B-C	4.3
11	4	B-C	6
11	4	B-C	7.3

Σ **407**



2) Location

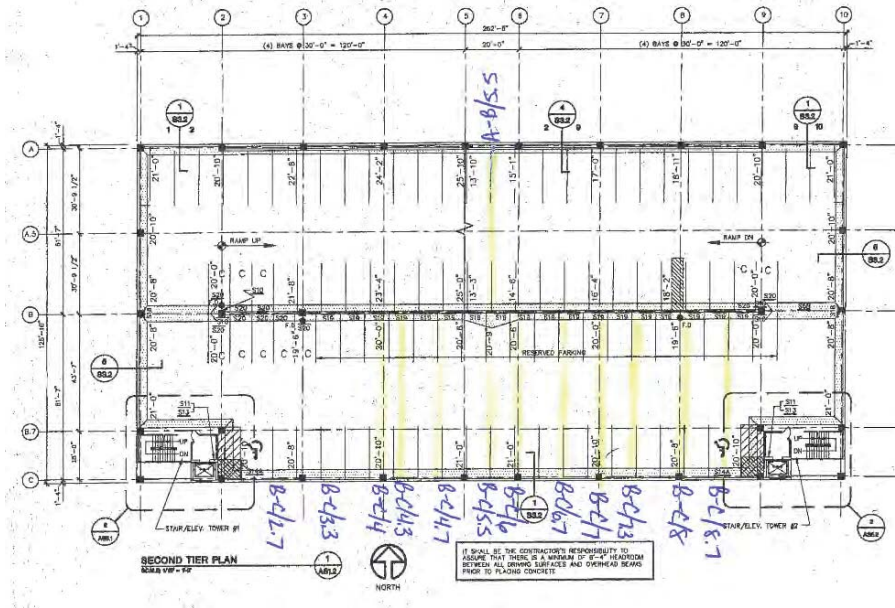


Figure 1 Second Tier Plan

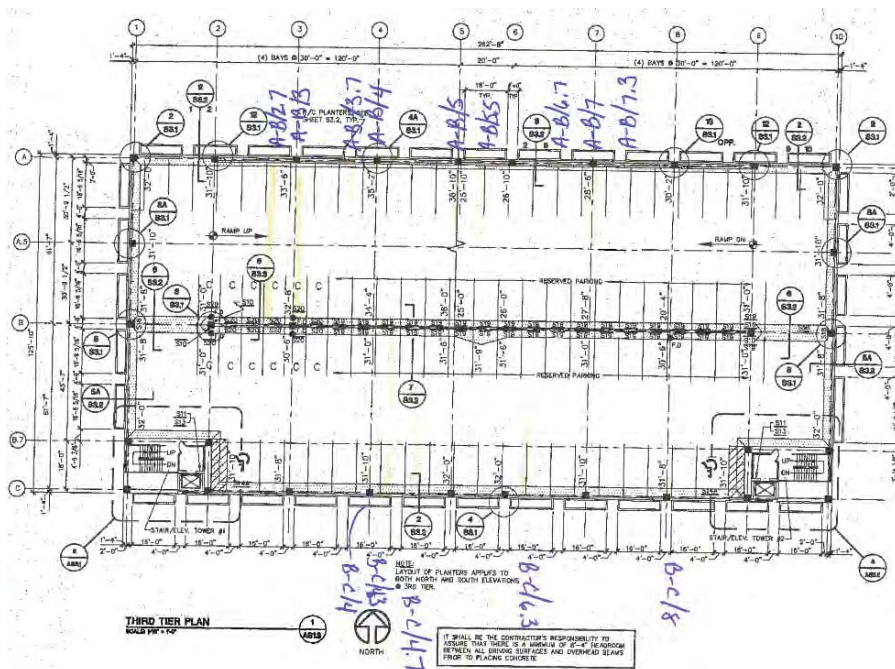


Figure 2 Third Tier Plan

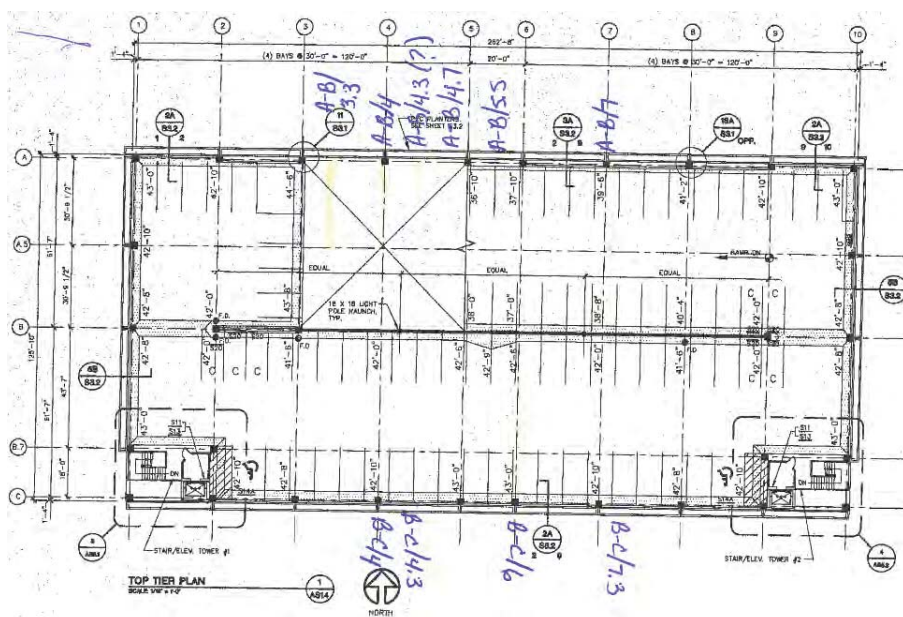


Figure 3 Top Tier Plan

### 3) Spacing

- .3 Relocate any biscuit placements that conflict with the existing connectors by at least 12 in.
- .4 Using an appropriate indelible marker draw a 18-19 in. line at approximately 90 degree angle across joint. Line should be centered at the joint.

### .2 Cutting

- .1 Hand held or walk behind saws are acceptable.
- .2 Wet or dry cut depending on conditions and contractor's choice.
- .3 Saw blades must be 14 in. in diameter
- .4 0.25 in. blade thickness or use place 2 blades, 1/8 in. thick.
- .5 Set saw cut at 3.5 in. if total thickness at joint is 4 in.; otherwise, cut depth to 0.5 in. from bottom of double-tee beam flange.
- .6 Saw cut 18 in. long slot centered on joint.
- .7 Cuts to be made perpendicular to joint.
- .8 Check each cut with a biscuit to assure slot is fully and adequately cut.

### .3 Cutting Clean Up and Slot Preparation

#### .1 Wet Cutting

- .1 Sweep up all slurry and remove.



- .2 Wash out slots using clean potable water (power washing preferred)
- .3 Allow slots to dry
- .4 Use Using 75 psi or greater oil free air to remove all dust and debris.
- .5 Using duct tape, mask off around each slot leaving approximately 1/16 in. of concrete showing at edge of slot. Make sure to push the tape down into the corners if the joint caulking is recessed.

#### .4 Dry Cutting

- .1 Sweep up all dust and chips.
- .2 Using 75 psi or greater oil free air, blow cuts clean of dust and debris.
- .3 Using duct tape, mask off around each slot leaving approximately 1/16 in. of concrete showing at edge of slot. Make sure to push the tape down into the corners if the joint caulking is recessed.

#### .5 Biscuit Preparation

- .1 Wipe biscuits down with MEK to remove any dirt and oils.
- .2 Set aside in clean dry location.

#### .6 Epoxy Mixing

- .1 The biscuit bond epoxy is a 1:1 ratio epoxy. That means that equal amounts of Base (A-Component) and Activator (B-component) must be used. Do not increase amount of Activator.
- .2 Use a dedicated scoop/spatula to remove a baseball sized amount of each component from their respective containers.
- .3 Place the two components on a mixing board adjacent to each other.
- .4 When ready to install a biscuit begin mixing the two components with each other using a 2 to 3 in. wide stiff scraper to trowel.
- .5 Mix epoxy until a uniform grey color is achieved and no visible black or white streaks remain.
- .6 Note: the proprietary epoxy paste is a very rapid hardening epoxy resin with high exothermic properties. Do not attempt to batch mix with mechanical mixers. Batch mixing will result in unworkable set times.

#### .7 Biscuit Installation

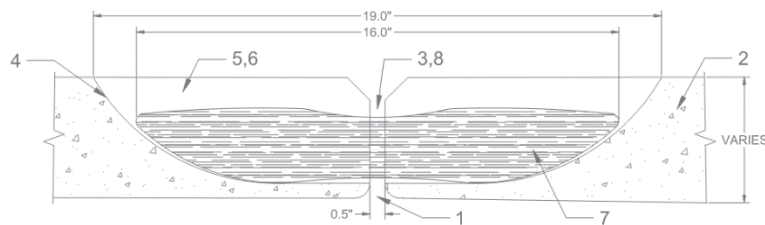
- .1 Using an appropriately sized putty knife or spatula, fill slot with epoxy paste.



- .2 Using putty knife and ¼ in. masonry tuck pointer, make sure epoxy is adhered to all sides of the slot.
- .3 Work out any air bubbles with putty knife by wiggling it back and forth in the slot.
- .4 Make sure the epoxy completely fills the slot
- .5 Coat a biscuit into epoxy, taking care to “work” it into the biscuits surface.
- .6 Place biscuit into epoxy filled slot assuring the entire biscuit is below the concrete deck surface.
- .7 Using putty knife, work the biscuit side to side in the slot to seat it and remove any trapped air.
- .8 Remove any excess epoxy level with taped surface.
- .9 Remove masking tape when epoxy begins to set. Do not let epoxy harden or the tape will be permanently adhered to the deck.

#### .8 Clean up

- .1 Clean up uncured epoxy using acetone or epoxy thinner.
- .2 Cured epoxy can only be removed by mechanical means.



1. IF JOINT IS OVER 1" WIDE CONTACT ENGINEER BEFORE PROCEEDING
2. EXISTING PRE-CAST DOUBLE TEE PLANK
3. EXISTING DOUBLE TEE JOINT WITH FAILED SHEAR CONNECTORS
4. 19" LONG X 3-1/2" DEEP SAW CUT MAXIMUM OF 0.5" FROM BOTTOM OF FLANGE MADE WITH ¼" WIDE X 14" DIAMETER BLADE
5. A) IF SAW CUTS WERE MADE WITH DRY BLADE, BLOW OUT SAW CUT WITH CLEAN COMPRESSED AIR  
B) IF WET CUTTING WAS USED, POWER WASH OUT CUTS AND ALLOW TO DRY FOR 24 HOURS AND THEN BLOW OUT WITH CLEAN COMPRESSED AIR

*Figure 4 Pre-Topped Biscuit Installation Detail*

BISCUIT INSTALLATION DETAIL

PRE TOPPED

1

#### .9 Cure Time

- .1 The repair needs eight (8) hours to reach full cure at 65 degrees F or greater.
- .2 There can be no movement of the deck or beams during the cure time.

**END OF SECTION XXXX**





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# FREQUENTLY ASKED QUESTIONS

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V2 COMPOSITES, INC  
770 Lee Road 191 Auburn, AL 36830  
Released: March 2022

## Biscuit FAQ

Where do I get the Biscuits?

Tee Biscuits are sold directly from our main location in Auburn, Alabama.

Call 334-502-3000 or e-mail us at [sales@V2composites.com](mailto:sales@V2composites.com)

Is the epoxy paste included with the Biscuits?

The proprietary Biscuit bond paste is sold as a complete package with the Biscuits and is included in the price of the Biscuits.

How many can I buy at a time?

Our standard packaging is 20 Biscuits with a 2-gallon kit of Biscuit Bond Paste. You can buy as little as five Biscuits at an adjusted price, but we will also include a kit of paste.

Can I use any type of epoxy with the Biscuits?

No, the system is designed around the Biscuit Bond Paste. Use of any other type of adhesive without our written approval will void any warranties.

What warranty is on the Biscuits?

The Biscuits are fully warranted for their physical properties and manufacturing.



Do you warranty the installation?

We are only a material supplier and do not perform any installations, therefore we have no direct control over the actual installation. As such we cannot warranty the final installation.

Do you provide engineering designs?

We provide the design engineers with the necessary technical information to design any installations, but we do not provide direct engineering services for the Biscuits.

Do I need special training?

Most concrete restoration or masonry contractors possesses the skill set to properly install the Biscuits, however we do require that the Biscuits be installed only by V2 Composites certified installers. We offer onsite training for an additional fee to achieve or renew that training.

Do I need special tools?

There are minimal tools that are required to put in the Biscuits. A complete list is included in our Installation Manual. Most contractors already have these tools or they are easily obtained at the local supply house.

How many can be installed in a day?

That is very job and contractor specific. But generally, a three-person crew can install in excess of 30 a day.



Do I have to repair the existing connections first?

The existing connections do not need to be repaired for the T-Biscuits to function as designed.

What do I do about the existing connections?

That is up to the engineer and the owner. If they only have the welds broken and are not presenting a spalling issue, they can just be left as is.

Can the Biscuits be put into a full depth repair?

The Biscuits can be installed into a properly designed, executed, and cured full depth repair.

Can the Biscuits be put into a partial depth spall repair?

The Biscuits can be installed into a properly designed, executed, and cured full depth repair.

What type of saw do I use?

The method to cut the slot is up to the contractor. To date the most success has been with some sort of walk behind concrete saw, either wet or dry cutting using a 14" diameter blade(s). For smaller or jobs, contractors use a handheld cutoff saw.

What if the slot is wet?

The slot should be dry to the touch with no standing water in it before any Biscuits are installed.



Can the slot be at an angle to the joint?

We do not recommend this as it puts excess stress on the concrete deck on the acute angled portion. We highly recommend the biscuit is installed at a 90-degree angle across the seam.

Can I cut through the joint sealant?

Yes, you can cut through the sealant and install the Biscuit. The sealant can then be repaired locally following the sealant manufacturer's instructions

Can I caulk over the Biscuit?

The center of the Biscuit is designed to be at least  $\frac{3}{4}$ " below the surface. The joint sealant should easily clear the top of the biscuit, so there should be no issue in applying sealant to the whole length of the joint. A proper bond breaker should be used over the actual Biscuit if it is in contact with the sealant.

Is the Biscuit repair waterproof?

While the nature of the Biscuit installation is waterproof, there are many external factors that affect an installations waterproofness. As such for full waterproof confidence, an additional waterproof membrane should be installed over the Biscuit installation.

Does the epoxy change color/fade in the sun (UV)?

The Biscuit Bond epoxy adhesive is structurally resistant to UV degradation, however there will be a slight change in color as it ages in the sun and is exposed to traffic.



The top of the Biscuit is interfering with the sealant, what do I do?

In certain cases, the top of the Biscuit extends into the sealant line. In such instances, the Biscuit can be slightly ground down to not interfere with the sealant.

Can I use a blower instead of an air compressor to clean out the slots?

No, a blower does not produce the needed velocity of air to properly remove the concrete dust from the slotting operation.

What diameter blade do I use?

The standard Biscuit is designed to be paired with a standard 14" diameter diamond concrete blade. Larger diameter blades will result in excessive cutting and paste usage.

How wide does the slot have to be?

The slot needs to be 1/4" to 5/16" in width.

What if I cut the slot in the wrong place?

You can fill the errant slot in with the Biscuit bond paste.

What happens if I get Biscuit half in, and the epoxy hardens?



You will have to grind it flat with the deck and then use the saw to re cut the slot thus removing the Biscuit.

The Biscuit is sticking out of the bottom of the deck, what do I do?

If the slot was over cut, or the decks were not in alignment, the Biscuit may protrude slightly from the bottom. It can be left that way or ground flush with the bottom. If it extends more than 1/2" of an inch contact us or the engineer.

How deep do I cut the slot?

The slot is always to be cut no less than 1/2" from the bottom face of the tee.

How long do I cut the slot?

For a standard depth slot, the cut should be 18" long centered on the joint.

What type of blade do I use to cut the slot?

A 1/4" wide x 14" diameter concrete blade is the top choice. Two standard 1/8" wide x 14" diameter blades can be stacked to achieve the same result.

Is the installation in a field top deck different from one in pre-topped tees?

There is no difference in how the Biscuits are installed. However, many field topped decks have a total thickness that is greater the standard pre-topped tee. This means that you may have to make the cut deeper and longer to get the Biscuit within 1/2" of the bottom.



How thin of a tee flange can the Biscuits be installed in?

The standard Biscuit can be installed in a deck as little as 3.25" thick. Custom Biscuits are available for decks as thin as 2.5"

What is the recommended spacing for the Biscuits?

The Biscuits are a one for one replacement for the existing connectors. Based on your engineers design they may be placed at a different spacing.

How close to an existing connector can I place a Biscuit?

Biscuits are to be placed no closer than 12" center to center of an existing connector.

How close to another Biscuit can I place a second one?

No closer than 12" center to center.

What is the widest gap between the tees is acceptable?

The maximum gap between the actual tees (not considering the sealant block out) is 1.0". Any greater than that you need to contact us or the engineer.

What is the lowest temperature that they can be installed?

A deck temperature of 40°F and rising is the lowest temperature that the Biscuits can be installed without special provisions.

What is the maximum installation temperature?





There is no actual temperature limit, however the Biscuit Bond will set to rapidly to be practically worked with in temperatures above 100°F. Also, extreme deck temperatures present some issues regarding thermal volume changes that should be discussed with your engineer.

How fast does the epoxy take to get hard?

The rate at which the Biscuit bond epoxy takes to set is very temperature dependent. At 70° the epoxy will set in about 15 minutes. This is not to be confused with the cure time which is of a much longer duration.

What is the ratio of Biscuits to existing connectors that is recommended?

The Biscuits are designed to be a 1:1 replacement for the existing connectors.

How close to the end of the tee should I put a Biscuit

No closer than 12"

Do I need to put more Biscuits in the drive lanes (middle) than the parking spaces (edges)

That is very dependent on the existing connector's locations. At times, design engineers have installed additional Biscuits in the drive lanes on specific decks. Consult with your design professional if you think they are needed.

Do I have to support or shore the deck to install the Biscuits?

No, you do not. However, you cannot allow the tees and newly installed Biscuits to be loaded prior to achieving full cure of the epoxy, which is 8 hours at 70°F.



How long do I have to wait until I can put traffic over the Biscuits?

At 70°F we recommend 8 hours of waiting time. For each 10 degrees change in temperature, cure time halves or doubles i.e., 60 degrees 16 hours, 80 degrees 4 hours.

Can I install them on a ramp?

Yes, you can.

Can I put them on a ramp/deck transition?

Yes, you can, but you will probably have to cut completely through the flat deck to accommodate the angle transition.

What if I cut through the deck?

Cutting through the deck is only an aesthetic and installation issue and does nothing to either the structural integrity of the deck or of the new Biscuit connection. Strong duct tape should be placed over the bottom of the cut to contain the epoxy during installation.

What if the adjacent tees are not level?

It is important to have the Biscuit no more than 1/2" from the bottom of both tees. This will necessitate having to cut through the bottom of the higher tee and having some Biscuit exposed. If the exposed Biscuit is aesthetically objectionable, it can be ground flush with the bottom of the deck.

Is it necessary to tape off the slots?



It is not necessary, but it leaves a very professional and aesthetically pleasing installation. It also makes the installation easier.

Do I have to use a tuck pointer or trowel in the slot?

Yes, this is a crucial step in getting a good solid bond with the existing concrete tee.

How much epoxy do I use?

A standard installation uses 10-12 oz of mixed Biscuit Bond. This is about a tennis ball size quantity of each component. Mix only one Biscuit worth of material at a time.

How do I mix the epoxy?

The Biscuit Bond epoxy is hand mixed on a board or other flat surface using a trowel or spatula.

Can I mix the epoxy with a mixing drill?

The use of mechanical mixers is strongly discouraged.

Can I mix in a bucket or pail?

Mixing in a bucket is impractical and strongly discouraged.

Can I use xylene, toluene, or paint thinner to clean the Biscuits off?

NO! These types of solvents contain oily additives that will inhibit the bond of the epoxy. Use only MEK or if unavailable Acetone.



How do I get the epoxy off my tools and or other items?

Uncured Biscuit Bond can be removed with Acetone. Hardened material can only be removed by abrasive methods.

How do I dispose of the excess/waste epoxy?

The hardened Biscuit Bond is environmentally safe to dispose of in standard refuse containers. The containers should be scraped clean and any excess mixed together and then disposed of in standard refuse containers.

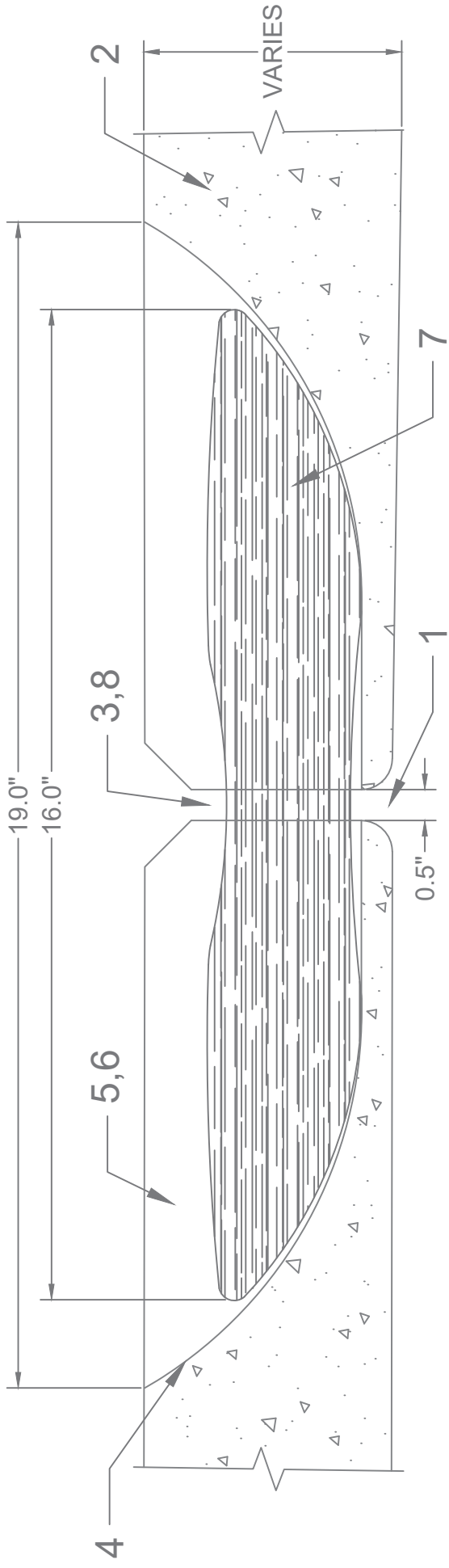
Why don't you put the epoxy in mixing cartridges?

Due to the viscosity (thickness) of the Biscuit Bond it is very difficult to use it in cartridges. Additionally, in warmer temperatures, you cannot get all the material mixed before the initial material starts to get hard.

If you have any questions that are not covered in this document or want further explanation to the answered questions, please contact us:

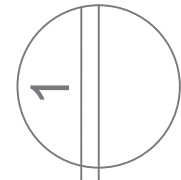
Call 334-502-3000 or e-mail us at [sales@V2composites.com](mailto:sales@V2composites.com)





1. IF JOINT IS OVER 1" WIDE CONTACT ENGINEER BEFORE PROCEEDING
2. EXISTING PRE-CAST DOUBLE TEE PLANK
3. EXISTING DOUBLE TEE JOINT WITH FAILED SHEAR CONNECTORS
4. 19" LONG X 3-1/2" DEEP SAW CUT MAXIMUM OF 0.5" FROM BOTTOM OF FLANGE MADE WITH 1/4" WIDE X 14" DIAMETER BLADE
5. A) IF SAW CUTS WERE MADE WITH DRY BLADE, BLOW OUT SAW CUT WITH CLEAN COMPRESSED AIR  
 B) IF WET CUTTING WAS USED, POWER WASH OUT CUTS AND ALLOW TO DRY FOR 24 HOURS AND THEN BLOW OUT WITH CLEAN COMPRESSED AIR
6. SAW CUT COMPLETELY FILLED WITH BISCUIT BOND EPOXY PASTE BY V2 COMPOSITES
7. APPLY BISCUIT BOND EPOXY PASTE TO BOTH SIDES OF BISCUIT AND INSERT INTO CUT SLOT
8. FOLLOWING BISCUIT INSTALLATION, REPLACE SEALANT 6" MINIMUM BOTH SIDES OF SAW CUT

## BISCUIT INSTALLATION DETAIL



# Biscuit Bond Paste

## High strength structural epoxy gel adhesive

### Product Description

V2 Biscuit Bond Paste is a two component, 100% solids, high strength, structural epoxy gel adhesive specifically designed for the installation of V2 Repair Biscuits and the structural bonding of other V2 composite laminates.

### Applications

- Bonding and embedding composite laminates to concrete, masonry, wood and steel
- Patching vertical and overhead concrete, masonry and wood surfaces
- Grouting deep dowel bars, bolts, pins, etc.
- Bonding similar and dissimilar materials such as concrete, metal, wood, etc.
- 

### Advantages

- Easy to work with; smooth gel consistency
- Super high strength
- Moisture insensitive
- Excellent bond strength
- Good chemical resistance
- USDA approved
- Conforms to ASTM C-881, types I, II, Grade 3, Class A, B and C

### Physical Properties

Mix ratio A:B	1:1 by volume		
Viscosity	Non-sag thixotropic gel		
Color	Concrete gray		
Pot life	60 gram (golf ball)	½ gallon (softball)	Tack free (1/8" layer)
90°F (32°C)	4 min.	3 min.	40 min.
73°F (23 °C)	8 min.	7 min.	1 hr., 30 min.
50°F (10 °C)	18 min.	10 min.	2 hr., 15 min.
Coverage			
(Neat)	231 cubic inches per gallon		
(Smooth surfaces)	1/8" thick = 12 sq. ft. per gallon		
(Rough surfaces)	1/8" thick = 6 sq. ft. per gallon		

### Test Data (strengths reported in PSI)

Compressive strength	ASTM D-695	7,050
Compressive modulus	ASTM D-638	2.30 x 105
Tensile strength	ASTM D-638	2,900
Tensile modulus	ASTM D-638	1.67 x 105
Bond strength	ASTM D-882	3,337 (2 day)
Dry cure		3,510 (14 day)
Elongation	ASTM D-638	1.8%
Shore hardness	D Scale	85
Heat deflection	ASTM D-648	124°F



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## Biscuit Bond Paste

### Application Techniques

**Material conditioning:** Pre-condition materials to 65-85°F (19 -30°C) before using.

**Surface preparation:** Surface must be clean and free of any dust, oil, grease, laitance, curing compounds, or any other contaminants. On concrete and steel, this should be achieved by sandblasting, water blasting or other mechanical means. Composite laminates should be wiped with MEK following any other preparation recommended by the manufacturer.

**Mixing considerations:** Measure exactly 1 part "A" to 1 part "B" by volume into a clean pail or onto a palette. Mix epoxy using hand methods to achieve a smooth consistency and uniform color.

**Note:** Large batches of epoxy will set up much faster than small batches. Only mix the amount of material that can be used within the pot life.

### Installing Material

**Bonding and embedding:** Apply material to the surfaces to be bonded taking care to work the material into the exposed surface. A glue line of 1/8" or less is desirable.

**Patching overhead and vertical surfaces:** Using a trowel or putty knife, apply material to area being patched. Up to one and a half parts oven dried sand may be added to the mixed epoxy to extend it and bring the coefficient of thermal expansion closer to that of concrete. Apply in 1-1/2" lifts or less.

**Grouting bolts and anchor bars:** Hole size should be no more than 1/8" larger than bar or bolt. Clean all dust out of the hole and grout with neat Biscuit Bond Paste.

### Packaging

2-gallon units  
10-gallon units

### Limitations

- Mixing at other than 1:1 ratio will result in reduced properties and will potentially inhibit curing
- Do not use solvents to thin
- Minimum application temperature is 40°F (5°C)
- Minimum age of concrete must be 21-28 days
- Forms a vapor barrier after cure
- Full cure in 7 days

### Caution

"A" material contains epoxy resins and may cause skin irritation. "B" material contains amines and may cause severe burns on skin.

### Storage

Store resin in a dry environment at a temperature between 40 - 90°F (4 - 32°C). Ideal temperature range is 65 - 75°F (18 - 24°C). Temperature below 60°F (16°C) will cause epoxy to thicken, making it difficult to properly blend the components. Under proper conditions, the shelf life is twelve (12) months in unopened, damage-free containers. *Protect from moisture. Do not allow product to freeze.*

### First Aid

**Skin contact:** Wipe off contaminated area and wash with soap and water.

**Eye contact:** Immediately flush eyes with large amounts of water. Seek medical attention.

**Inhalation:** Move to fresh air if symptoms occur. If breathing is difficult, get medical attention.

**Ingestion:** Seek immediate medical attention.

See MSDS for more information.



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# V2 T-Biscuits

## Custom carbon fiber reinforced plastic laminates

### Product Description

V2 T-Biscuits are custom carbon fiber reinforced plastic laminates designed to repair the failed flange-to-flange shear connectors of pre-cast concrete (single & double) Tee beams. A specially engineered tri-axial carbon fabric is used to provide high strength, while a proprietary textured exterior face is provided for additional toughness as well as a rough bonding surface. The constituent resin matrix is a proprietary epoxy with proven ability to provide strength along with superior chemical resistance, especially to salt and gasoline. Using a proprietary aerospace composite manufacturing technique, the fabric and resin are combined to form a finished carbon fiber laminate.

### Advantages

- Easy and fast installation
- Minimal disruption to operations
- Superior strength and toughness
- Chemical resistant

Typical Biscuit Properties At The Joint (Maximum 1.0" gap)			
Thickness in. (cm)	Tensile Capacity lbs. (kgs.)	Compressive Capacity lbs. (kgs.)	Shear Capacity lbs. (kgs.)
0.18 (0.45)	49,860 (22,665)	19,030 (8,650)	9,585 (4,355)
Laminate Properties			
Tensile Strength (along X/Y axis)		138,500 psi (955 MPa)	
Compressive Strength (along X/Y axis)		52,585 psi (363 MPa)	
Compressive Strength (through thickness)		9,200 psi (63 MPa)	
In Plane Shear Strength (along the Z axis or through thickness)		26,630 psi (184 MPa)	
Inter Laminar Shear (along X/Y axis)		5,075 psi (35 MPa)	
Bond Strength to Concrete (using V2 Biscuit Bond Epoxy)		2,760 psi (19 MPa)	
Design Value (5k psi concrete)			
		Ultimate Value lbs. (kgs.)	Design Value lbs. (kgs.)
Vertical Shear		8,000 lbs. (3,629)	6,000 (2,722)
Horizontal Shear		17,200 lbs.	13,000 (5,897)
Tension (Pull Out)		16,500 lbs.	12,400 (5,625)

# Product Data Sheet



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# Product Data Sheet

## V2 T-Biscuits

### Installation With V2 Biscuit Bond Paste

1. Using a 14" diameter concrete saw, make a cut .25" wide by 19" long at a 90° angle across the joint. The depth of the cut should be no greater than ½" from the bottom of the flange of the double T. Typically, the cut is approximately 3.5" deep.
2. If the slots were dry cut, using compressed air with a minimum of 100 psi, clean out the slots to remove dirt and dust. If the slots were wet cut, pressure wash the slots to remove slurry or dirt. Allow 24 hours to dry. Mask off the top of the groove with duct tape (for a cleaner look).
3. Mix the Biscuit Bond Paste according manufacturer's instructions and fill the groove with a liberal amount of epoxy and work it in with a trowel or putty knife.
4. Apply Biscuit Bond to both sides of the T- Biscuit and place into the groove working all of the air out of the groove with a putty knife. Allow to gel. Once epoxy has set, remove duct tape.

### Mixing Considerations for Paste

Measure exactly 1 part "A" to 1 part "B" by volume into clean pail or onto a palette. Mix epoxy using hand methods to achieve a smooth consistency and uniform color.

*Note: Large batches of epoxy will set up much faster than small batches. Only mix the amount of material that can be used within the pot life.*

### Storage

T-Biscuits and Biscuit Bond Paste should be stored in a dry environment at a temperature between 40° to 90°F (4° to 32°C). Ideal temperature range is 65° to 75°F (18° to 24°C). Temperatures below 60°F (16°C) will cause epoxy to thicken, making it difficult to properly blend the components. Under proper conditions, the shelf life of epoxy is twelve (12) months in unopened, damage-free containers. Protect from moisture. Do not allow product to freeze.

### Clean Up & First Aid

Clean equipment immediately after use with MEK or Acetone. Wash skin with soap and water. Wash contaminated clothing before re-use. See SDS for more information.

### Caution

Paste "A" material contains epoxy resins and may cause skin irritation. Paste "B" material contains amines and may cause severe burns on skin.

### Warranty

V2 Structural Systems warrants its products to be free from manufacturing defect and ensures those products meet the published characteristics when tested in accordance with ASTM and V2 standards. No other warranties by V2 are expressed or implied, including no warranty of merchantability or fitness for a particular purpose. V2 will not be liable for damages of any sort resulting from any claimed breach of warranty. V2's liability under this warranty is limited to replacement of material or refund of the sales price of the material. There are no warranties on any product that has exceeded the "shelf life" or "expiration date" printed on the package label.



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## V2-Biscuit Installation Manual

# V2-Biscuit Installation Manual

1. Introduction to V2-Biscuits
2. Materials Needed for Installation
3. Deck Layout and Biscuit Locations
4. Saw Cutting
5. Clean Up and Slot Preparations
6. Biscuit Preparations and Epoxy Mixing
7. Biscuit Installation
8. Clean Up and Cure Times



## Introduction to V2-Biscuits

### General Description

V2 T-Biscuits are custom carbon/glass fiber reinforced plastic laminates designed to repair failed flange-to-flange shear connectors of pre-cast concrete (single & double) Tee beams.



### Important Notice

V2 Biscuits™ must only be installed by contractors trained and qualified by V2 Composites AND all installations shall adhere to the guide lines described in this document. V2 Composites does not warrant and assumes no liability for V2-Biscuits™ products that are installed by anyone who is not certified by V2 Composites or are installed outside the guidelines of this document without express written permission of V2 Composites.

V2 Composites asserts no claim as to the fitness or final design of its products for a specific installation. That determination must be made by a qualified design professional.

This manual, including the referenced standards is subject to change at any time without notice. It is the responsibility of the installer to verify the latest edition of this manual from the V2 Composites website.

## Materials Needed for Installation

### Mandatory Equipment

- **Walk Behind Concrete Saw**
  - Will need 2 blades that are 1/8" width each
  - Saw may be dry cut or water cooled
  - If using wet, must clean debris from slot by power washing and allow a minimum of 24 hours to dry

OR

- **14" Hand Held Cut Off Saw**
  - Gas or electric
  - Same arbor size as walk behind
  - Will need 2 blades that are 1/8" width each



- **Air Compressor with Hose and Blow Down Nozzle**
  - This will be used to blow out saw cut
  - Compressor can be small one
  - Compressor must be a minimum of 100 psi of clean air



- **Hawk Boards or Scrap Plywood or Heavy Cardboard**
  - One piece for every 4-5 biscuits

## Materials Needed for Installation

### Mandatory Equipment Continued

- MEK (preferred) or Acetone
  - Will need 2 one-gallon cans
  - Do NOT use Xylene



- 3 Margin Trowels—1.5" to 2"
  - Can be inexpensive
  - One for each Paste Component and One to Mix



- Masonry Tuck Pointer -1/4"



- Plastic buckets (Two-gallon size)
  - Will need 2 or 3
  - Will need lids for 1 or 2



## Materials Needed for Installation

### Mandatory Equipment Continued

- Rubber Gloves
  - Recommend blue nitrile



### Will also need:

- Plastic Putty Knives
- Safety Glasses
- Tape Measure
- Red or Black Lumber Crayon
- Utility Knife
- Duct Tape
- Rags
- Trash Receptacle



### Optional Equipment

- 4" Grinder
  - Diamond cutoff wheel
  - Steel cut off wheel
  - Used to trim any biscuits, concrete or rebar, as needed
- Backer Rod
  - Used to keep epoxy from falling through deck
  - Sized for width of deck joint
  - 4" - 6" per biscuit



## Deck Layout and Biscuit Locations

- Determine the location of the existing steel embedments/clips and mark on top deck surface.



- Lay out the biscuits locations per the engineer's design.
- Relocate any biscuit placements that conflict with the existing metal embedments by at least 12 inches.
- Mark saw cuts using appropriate indelible marker, 18" on center at 90 degrees across the joint.





## Saw Cutting

- To make the cuts in the deck, use either a hand held or walk behind saw
  - Can be either wet or dry cut
  - Blade must be 14" in diameter



- Make a ¼" wide cut that is 18" long centered on the joint while using 2 blades 1/8" each.



- Cut depth should be within a ½" from the bottom of the flange of the T

- Check each cut with a biscuit to assure slot is adequately cut



## Cutting Clean Up and Slot Preparation

### • Wet Cutting

- Sweep up all slurry and remove.
  - Wash out slots using clean potable water .(power washing preferred)
  - Allow slots to dry.
- \* Use a high volume (40 CFM or better) - high pressure (100 psi or greater) air to dry slots if the installation is to be done immediately following saw cutting.



### • Dry Cutting

- Sweep up all dust and chips.
- Using 100 psi or greater oil free air compressor, blow cuts clean of dust.



- Using duct tape, mask off around each slot leaving approximately 1/16" of concrete showing at the edge of the slot. Make sure to push the tape down in the corners if the joint caulking is recessed.



## Biscuit Preparation and Epoxy Mixing

### Biscuit Prep

- To prep the biscuits, wipe down with MEK (or acetone) to remove dirt and oil. Set aside in clean, dry location until ready to use.



### Epoxy Mixing

- The biscuit bond epoxy is a 1:1 ratio epoxy. That means that equal amounts of Base (A-Component) and Activator (B-Component) must be used.

\*BISCUIT BOND IS ALREADY SPECIALLY FORMULATED FOR A FAST STRONG SET. MIXING EXTRA ACTIVATOR WILL NOT INCREASE THE CURE TIME.

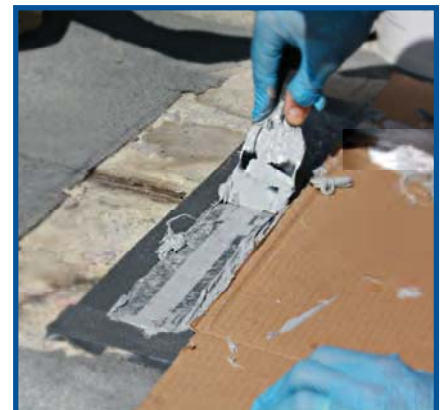


- Use a dedicated scoop/spatula to remove a baseball sized amount of each component from their respective containers.
- Place the two components on a mixing board adjacent to each other.
- When ready to install a biscuit, begin mixing the two components with each other using a 2"-3" stiff scraper or trowel.
- Mix the epoxy until a uniform grey color is achieved and no visible black or white streaks remain.



## Biscuit Installation

- Using an appropriately sized putty knife or spatula, fill slot with epoxy paste.
  - Using putty knife and ¼" masonry tuck pointer, make sure epoxy is adhered to all sides of the slot .
  - Ensure there are no air bubbles with putty knife by working it back and forth in the slot.
  - Make sure that the epoxy completely fills the slot.
- Coat a biscuit with epoxy, taking care to "work" it into the biscuits surface.
- Place biscuit into epoxy filled slot assuring that the entire biscuit is below the concrete deck surface.
- Using putty knife, work the biscuit side to side in the slot to seat it and remove any trapped air.
- Remove any excess epoxy level with taped surface.
- Remove masking tape when epoxy begins to set. NOTE: DO NOT LET EPOXY HARDEN OR THE TAPE WILL BE PERMENATLY ADHERED TO THE DECK.



## Clean Up and Cure Time

### Clean Up

- Clean up uncured epoxy using acetone or epoxy thinner.
- Cured epoxy can only be removed by mechanical means.



### Cure Time

- The repair needs eight (8) hours to reach full cure at 45 degrees F or greater.
- There can be no movement of the beams during the cure time.

