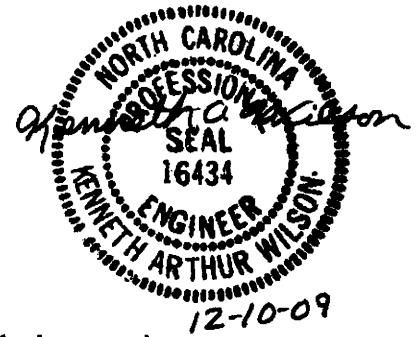


**ELASTOMERIC CONCRETE FOR JOINT REPAIR**  
**(10-12-01)**



**DESCRIPTION**

Contractor shall repair damaged concrete adjacent to expansion joints with elastomeric concrete or use the elastomeric concrete in the blocked out areas on both sides of the bridge deck joints as directed by the Engineer.

Contractor shall submit falsework plans for approval. Falsework plans shall take into account expansion of the bridgedeck due to changes in temperature.

Do not place elastomeric concrete if the ambient air temperature is below 45°F (7°C). Prepare and apply a primer, as per manufacturer's recommendations, to all vertical concrete faces, all steel components to be in contact with elastomeric concrete, and to areas specified by the manufacturer. Align the angles with the joint opening.

Prepare, batch, and place the elastomeric concrete in accordance with the manufacturer's instructions. Place the elastomeric concrete while the primer is still tacky and within 2 hours after applying the primer. Properly consolidate the elastomeric concrete around the steel and anchors.

Tarps are to be utilized under the mixing areas, and the bridge deck joint shall be taped off to protect the bridge deck from spills during elastomeric concrete installation.

**MATERIALS**

Elastomeric concrete is a mixture of a two-part polymer consisting of polyurethane and/or epoxy, and kiln-dried aggregate. Have the manufacturer supply it as a unit.

Provide materials that comply with the following minimum requirements at 14 days.

CONCRETE PROPERTIES	TEST METHOD	MINIMUM REQUIREMENT
Bond Strength to Concrete, psi (MPa)	ASTM D638 (D638M)	450 (3.1)
Brittleness by Impact, ft-lb (kg-m)	Ball Drop	7 (0.97)
Compressive Strength, psi (MPa)	ASTM D695 (D695M)	2800 (19.3)
BINDER PROPERTIES (without aggregate)	TEST METHOD	MINIMUM REQUIREMENT
Tensile Strength, psi (MPa)	ASTM D638 (D638M)	800 (5.5)

Ultimate Elongation	ASTM D638 (D638M)	150%
Tear Resistance, lb/in (kN/m)	ASTM D624	90 (15.7)

In addition to the requirements above, use elastomeric concrete that also resists water, chemical, UV, and ozone exposure and withstands extreme temperature (freeze-thaw) changes.

Furnish a manufacturer's certification verifying that the materials satisfy the above requirements. Provide samples of elastomeric concrete to the Engineer, if requested, to independently verify conformance with the above requirements.

#### **BASIS OF PAYMENT**

The entire cost for joint repair using elastomeric concrete including but not limited to materials, labor, maintenance, equipment, tools and incidentals will be included in the unit price for Generic Structure Item Elastomeric Concrete for Joint Repair.

Payments shall be made under:

Generic Structure Item Elastomeric Concrete for Joint Repair .....Square Yard



## Concrete Deck Repair using Elastomeric Concrete

### DESCRIPTION

All areas of concrete deck repair shall be designated by the Engineer. The Contractor shall begin work within 60 days of notification.

12-10-09

All areas of concrete deck repairs shall be made with elastomeric concrete. Full depth concrete deck repair will be done in these areas unless determined otherwise by the Engineer. These areas shall be saw cut and material shall be applied according to the material specifications.

Do not place elastomeric concrete if the ambient air temperature is below 45°F (7°C). Prepare and apply a primer, as per manufacturer's recommendations, to all vertical concrete faces, all steel components to be in contact with elastomeric concrete, and to areas specified by the manufacturer. Align the angles with the joint opening.

Prepare, batch, and place the elastomeric concrete in accordance with the manufacturer's instructions. Place the elastomeric concrete while the primer is still tacky and within 2 hours after applying the primer. Properly consolidate the elastomeric concrete around the steel and anchors.

Tarps shall be utilized under the mixing areas, and the bridge deck joint shall be taped off to protect the bridge deck from spills during elastomeric concrete installation.

### MATERIALS

Elastomeric concrete is a mixture of a two-part polymer consisting of polyurethane and/or epoxy, and kiln-dried aggregate. Have the manufacturer supply it as a unit.

Provide materials that comply with the following minimum requirements at 14 days.

CONCRETE PROPERTIES	TEST METHOD	MINIMUM REQUIREMENT
Bond Strength to Concrete, psi (MPa)	ASTM D638 (D638M)	450 (3.1)
Brittleness by Impact, ft-lb (kg-m)	Ball Drop	7 (0.97)
Compressive Strength, psi (MPa)	ASTM D695 (D695M)	2800 (19.3)

BINDER PROPERTIES (without aggregate)	TEST METHOD	MINIMUM REQUIREMENT
Tensile Strength, psi (MPa)	ASTM D638 (D638M)	800 (5.5)
Ultimate Elongation	ASTM D638 (D638M)	150%
Tear Resistance, lb/in (kN/m)	ASTM D624	90 (15.7)

In addition to the requirements above, use elastomeric concrete that also resists water, chemical, UV, and ozone exposure and withstands extreme temperature (freeze-thaw) changes.

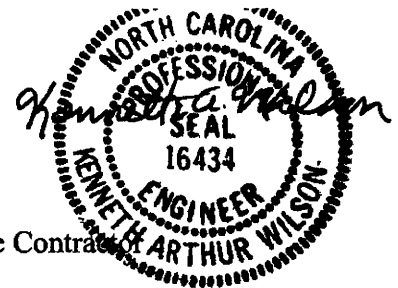
Furnish a manufacturer's certification verifying that the materials satisfy the above requirements. Provide samples of elastomeric concrete to the Engineer, if requested, to independently verify conformance with the above requirements.

#### BASIS OF PAYMENT

The entire cost for concrete deck repair using elastomeric concrete including, but not limited to, materials, labor, maintenance, equipment, tools, and incidentals will be included in the unit price for Generic Structure Item Concrete Deck Repair using Elastomeric Concrete.

Payments shall be made under:

Generic Structure Item Concrete Deck Repair using Elastomeric Concrete.....Square  
Yard



12-10-09

## **PLACEMENT OF EPOXY**

All bridges, to have epoxy applied, shall be designated by the Engineer. The Contractor shall begin work within 60 days of notification.

This work is for the placement of epoxy to concrete bridge decks. All decks shall be cleaned according to the material specifications. Two layers of epoxy (20 – 25 mills first layer and 15 – 20 mills second layer) and approved aggregate shall be applied in accordance with the material specifications

No debris shall be removed in such a manner that it comes into contact with the traveling public or any rivers or streams.

The Contractor shall notify the Engineer at the beginning of each week of his intended schedule.

## **HOW TO USE**

### **SURFACE PREPARATION:**

All surfaces must be structurally sound, clean and free of dirt, dust, oil, grease or any contaminant that would adversely affect the bond. Surfaces may be dry or damp, but free of standing water. Also before using check with the manufacture's recommendations for minimum temperature for application.

Epoxy concretes and mortar generally bond very well to properly prepared concrete, It is essential that the surface to which the epoxy is to be applied be sound and clean. Dirt, oil, grease, laitance or other surface deposit can interfere with the bond of the epoxy to the substrate.

It is necessary to determine the surface preparation requirements prior to the application of the epoxy. Chain drags, hammer sounding, infrared thermography, radar, cores, ultra sound, and other evaluation methods may be used to determine the extent of the deteriorated concrete that must be removed and replaced. This evaluation should determine the presence of laitance, curing compound, patching compounds, sealers, etc., that must be removed.

Weak, delaminated areas shall be removed using chipping hammers, scarifiers, scabblers, and/or hydrodemolition. Other techniques may be used especially where more extensive concrete removal is necessary. The method used to remove deteriorated concrete should not weaken or crack the surrounding sound concrete. A saw cut around the area to be removed shall be made to reduce edge spalling and provide a sound surface in which to place the patching material.

Additional cleaning is necessary to remove any debris remaining after the removal of unsound concrete. Sandblasting, shotblasting, a scabber, grinding or high pressure water jet can be used to clean surface contaminates from the deck before the epoxy is placed.

Oil-free compressed air may be used to remove any dust or debris immediately prior to the application of the epoxy.

**MIXING:**

Pre-mix each component separately. Place in a clean container, 2 parts by volume of Component A (Resin) and then add 1 part of Component B (Hardener). Container should have a flat wall and flat bottom. Stir and mix until material is thoroughly blended. Mixing should be completed after 2 minutes of thorough blending. The importance of thorough mixing and blending cannot be over emphasized. The two components must be thoroughly mixed and mated. If you are mixing correctly, bubbles will be whipped into the mixture. Do not be concerned; this is a sign that you are mixing well. Improper mixing can result in soft or sticky spots.

To eliminate problems of improper mixing, the Contractor shall use two mixing containers. Mix thoroughly in one container.

After you feel it is thoroughly mixed, scrape all the material from one container to the second container. After material has been placed in the second clean container, thoroughly mix for an additional 1 to 1 1/2 minutes.

With this double type of mixing, any material that might not have been thoroughly mixed from the sides or the bottom of the first container will be easily placed in the second container and thus will receive thorough mixing at that time. Mix only that quantity that can be used within its working time.

**APPLICATION:**

**BROADCAST OVERLAY:** Spread the properly mixed Epoxy on the surface using squeegees at the rate in accordance with the manufacture's recommendations. Allow materials to level. Broadcast aggregate, while epoxy is still wet and tacky, in such a manner as to permit the aggregate to fall vertically into the wet epoxy. Aggregate should be broadcast uniformly to completely cover the epoxy surface. No wet spots should be visible. Apply a slight excess amount. Aggregate is usually broadcast at the rate of 1 to 1 1/2 lbs. per sq. ft. (A hand held lateral type mechanical fertilizer may be used.) After initial set of the epoxy, excess aggregate must be removed. Brooming or a high powered vacuum is recommended. For tough areas and bridges a second coat is needed.

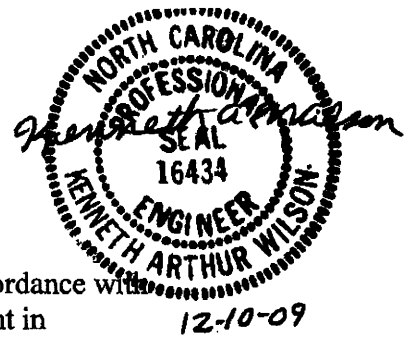
**AGGREGATE SIZE:** For light wear, with a minimum anti-skid properties consider an aggregate size of 40-90 sieve. For decorative finish apply a thin pigmented coating of a high solids epoxy or urethane to the properly cured epoxy. For TOUGH INDUSTRIAL applications and bridge decks to obtain best skid resistance consider using a blend of aggregate from 100% passing a #4 sieve to a minimum % passing a #16 sieve.

**PAYMENT:** The entire cost for the cleaning of the decks and the placement of epoxy, including but not limited to labor, maintenance, equipment, tools, and incidentals will be included in the unit price for Generic Structure Item Placement of Epoxy.

The cost for Traffic Control shall be paid as a separate item on "as needed" basis.

Payments shall be made under:

Generic Structure Item Placement of Epoxy .....Square Foot



## EVAZOTE EXPANSION JOINT REPLACEMENT

Contractor shall remove the existing expansion joint, clean the area in accordance with the manufacturer's recommendations, and place the evazote expansion joint in accordance with the manufacturer's recommendations. Contractor shall have a manufacturer's representative present during the installation of the first evazote expansion joint of the project. The expansion joint shall be replaced with the materials stated in this contract.

All materials shall be delivered unopened in their original containers bearing the manufacturer's label, date of manufacture, batch number, trade name brand, and quantity. Sufficient material to perform the entire expansion joint shall be "on hand" prior to removing the existing expansion joint. Stored materials may be inspected prior to their use and shall meet the requirements of these provisions. Each shipment of repair material shall be accompanied by Material Safety Data Sheets (MSDS) and a certificate of compliance certifying that the materials conform to the requirements of these provisions.

### Evazote Joint Seal Specifications

Use preformed seals compatible with concrete and resistant to abrasion, oxidation, oils, gasoline, salt and other materials that are spilled on or applied to the surface. Use a low-density closed cell, cross-linked ethylene vinyl acetate polyethylene copolymer nitrogen blown material for the seal. Use seals manufactured with grooves 1/8" (3 mm) ± wide by 1/8" (3 mm) ± deep and spaced between 1/4 (6 mm) and 1/2 inch (13 mm) apart along the bond surface running the length of the joint. Use seals sized so that the depth of the seal meets the manufacturer's recommendation, but is not less than 70% of the uncompressed width. Provide a seal designed so that, when compressed, the center portion of the top does not extend upward above the original height of the seal by more than 1/4 inch (6 mm). Splice the seal using the heat welding method by placing the joint material ends against a Teflon heating iron of 350°F (177°C) for 7 - 10 seconds, then pressing the ends together tightly. Do not test the welding until the material has completely cooled. Use material that resists weathering and ultraviolet rays. Provide a seal that has a working range of 30% tension and 60% compression and is watertight along its entire length including the ends. Have the top of the evazote seal clearly shop marked. Inspect the evazote seals upon receipt to ensure that the marks are clearly visible upon installation.



Provide seals that meet the requirements given below:

TEST	TEST METHOD	REQUIREMENT
Elongation at break	ASTM D3575	210 ± 15%
Tensile strength, psi (kPa)	ASTM D3575	110 ± 15 (755 ± 100)
Compression Recovery (% of original width)	AASHTO T42 50% compr. for 22 hr. @ 73°F (23°C) 1/2 hr. recovery	87 ± 3
Weather/Deterioration	AASHTO T42 Accelerated Weathering	No deterioration for 10 years min.
Compression/Deflection	@ 50% deflection of original width @ 50% deflection of original width	10 psi (69 kPa) min. 60 psi (414 kPa) max.
Tear Strength, psi (kPa)	ASTM D624	16 ± 3 (110 ± 20)
Density	ASTM D545	2.8 to 3.4
Water Absorption (% vol/vol)	ASTM D3575 Total immersion for 3 months	3

#### Adhesives

Use a two component, 100% solid, modified epoxy adhesive with the seal that meets the requirements of ASTM C881, Type 1, Grade 3, Class B & C and has the following physical properties:

Tensile strength 3500 psi (24.1 MPa) min.

Compressive strength 7000 psi (48.3 MPa) min.

Shore D Hardness 75 psi (0.5 MPa) min.

Water Absorption 0.25% by weight

Use an adhesive that is workable to 40°F (4°C). When installing in temperatures below 40°F (4°C) or for application on moist, difficult to dry concrete surfaces, use an adhesive specified by the manufacturer of the joint material.

Joint Preparation

After removal of existing joint, area must be sand-blasted immediately prior to installation of the new joint. Blasting medium shall be a non-silica product. Blasting medium shall be swept up and removed from the project. Traffic shall be protected from blasting operations. Joint shall be re-cleaned (and re-blasted if necessary), if joint installation is delayed and joint is determined to be unsuitable due to dirt, oils, etc.

Exact size of joint seals to be used where joints have been repaired with Elastomeric Concrete shall be determined after the Elastomeric Concrete work is completed.

Seal Installation

Do not install the joint seal if the ambient air temperature is below 45°F (7°C).

Begin installation at the low end of the joint after applying the mixed epoxy to the sides of both the joint material and both sides of the joint, making certain to completely fill the grooves with epoxy. With gloved hands, compress the material and with the help of a blunt probe, push it down into the joint until it is recessed approximately 1/4 inch (6 mm) below the surface. Do not push the seal at an angle that would stretch the material. Once work on a joint begins, do not stop until it is completed. Clean the excess epoxy off the surface of the joint material quickly and thoroughly. Do not use solvents to remove excess epoxy. Remove excess epoxy in accordance with the joint manufacturer's recommendations.

The entire cost for the Evazote expansion joint replacement including but not limited to labor, maintenance, equipment, tools, and incidentals will be included in the unit prices for Generic Structure Item Evazote Expansion Joint Replacement .

Payments shall be made under:

Generic Structure Item Evazote Expansion Joint Replacement. . . . . Linear Feet